NASA SP-7039 (41)
July 1992

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS

NASA STI PROGRAM
SCIENTIFIC & TECHNICAL INFORMATION

NASA SP-7039 (41)
July 1992

NASA PATENT ABSTRACTS BIBLIOGRAPHY

A CONTINUING BIBLIOGRAPHY
SECTION 1 ABSTRACTS

National Aeronautics and Space Administration
Scientific and Technical Information Program
Washington, DC 1992

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INTRODUCTION

Several thousand inventions result each year from the aeronautical and space research supported by the National Aeronautics and Space Administration. The inventions having important use in government programs or significant commercial potential are usually patented by NASA. These inventions cover practically all fields of technology and include many that have useful and valuable commercial application.

NASA inventions best serve the interests of the United States when their benefits are available to the public. In many instances, the granting of nonexclusive or exclusive licenses for the practice of these inventions may assist in the accomplishment of this objective. This bibliography is published as a service to companies, firms, and individuals seeking new, licensable products for the commercial market.

The *NASA Patent Abstracts Bibliography (NASA PAB)* is a semiannual NASA publication containing comprehensive abstracts and indexes of NASA-owned inventions covered by U.S. patents and applications for patent. The citations included in *NASA PAB* were originally published in NASA's *Scientific and Technical Aerospace Reports (STAR)* and cover *STAR* announcements made since May 1969.

For the convenience of the user, each issue of *NASA PAB* has a separately bound Abstract Section (Section 1) and Index Section (Section 2). Although each Abstract Section covers only the indicated six-month period, the Index Section is cumulative covering all NASA-owned inventions announced in *STAR* since 1969. Thus a complete set of *NASA PAB* would consist of the Abstract Sections of Issue 04 (January 1974) and Issue 12 (January 1978) and the Abstract Section for all subsequent issues and the Index Section for the most recent issue.

The 131 citations published in this issue of the Abstract Section cover the period January 1992 through June 1992. The Index Section references over 5200 citations covering the period May 1969 through June 1992.

ABSTRACT SECTION (SECTION 1)

This *PAB* issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in *PAB* supplements (01) through (06) covering *STAR* abstracts from May 1969 through January 1974. Each entry in the Abstract Section consists of a *STAR* citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in order of the ascending NASA Accession Number originally assigned for *STAR* to the invention. The range of NASA Accession Numbers within each issue is printed on the inside front cover.

Abstract Citation Data Elements: Each of the abstract citations has several data elements useful for identification and indexing purposes, as follows:

NASA Accession Number
NASA Case Number
Inventor's Name
Title of Invention
U.S. Patent Application Serial Number
U.S. Patent Number (for issued patents only)
U.S. Patent Office Classification Number(s)
(for issued patents only)

These data elements are identified in the Typical Citation and Abstract and in the indexes.

INDEX SECTION (SECTION 2)

The Index Section is divided into five indexes. These indexes are cross-indexed and are used to locate a single invention or groups of inventions.

Subject Index: Lists all inventions according to appropriate alphabetized technical term and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Inventor Index: Lists all inventions according to alphabetized names of inventors and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Source Index: Lists all inventions according to alphabetized source of invention (i.e., name of contractor or government installation where invention was made) and indicates the related NASA Case Number, the Subject Category Number, and the Accession Number.

Number Index: Lists inventions in order of ascending (1) NASA Case Number, (2) U.S. Patent Application Serial Number, (3) U.S. Patent Classification Number, and (4) U.S. Patent Number and indicates the related Subject Category Number and the Accession Number.

Accession Number Index: Lists all inventions in order of ascending Accession Number and indicates the related Subject Category Number, the NASA Case Number, the U.S. Patent Application Serial Number, the U.S. Patent Classification Number, and the U.S. Patent Number.

HOW TO USE THIS PUBLICATION TO IDENTIFY NASA INVENTIONS

To identify one or more NASA inventions within a specific technical field or subject, several techniques are possible with the flexibility incorporated into the *NASA PAB*.

(1) *Using Subject Category:* To identify all NASA inventions in any one of the subject categories in this issue of *NASA PAB*, select the desired Subject Category in the Abstract Section (Section 1) and find the inventions abstracted thereunder.

(2) *Using Subject Index:* To identify all NASA inventions listed under a desired technical subject index term, (A) turn to the cumulative Subject Index in the Index Section and find the invention(s) listed under the desired technical subject term. (B) Note the indicated Accession Number and the Subject Category Number. (C) Using the indicated Accession Number, turn to the inside front cover of the Index Section to determine which issue of the Abstract Section includes the Accession Number desired. (D) To find the abstract of the particular invention in the issue of the Abstract Section selected, (1) use the Subject Category Number to locate the Subject Category and (2) use the Accession Number to locate the desired invention within the Subject Category listing.

(3) *Using Patent Classification Index:* To identify all inventions covered by issued NASA patents (not including applications for patent) within a desired Patent Classification, (A) turn to the Patent Classification Number in the Number Index of Section 2 and find the associated invention(s), and (B) follow the instructions outlined in (2)(B), and (D) above.

TYPICAL CITATION AND ABSTRACT

NASA SPONSORED

ACCESSION NUMBER → **N92-16026*** National Aeronautics and Space Administration. ← CORPORATE SOURCE
Ames Research Center, Moffett Field, CA.

TITLE → **TOUGHENED UNI-PIECE FIBROUS INSULATION Patent**

INVENTORS → DANIEL B LEISER, inventor (to NASA), MARNELL SMITH, inventor (to NASA), REX A. CHURCHWARD, inventor (to NASA), and VICTOR W. KATVALA, inventor (to NASA) 7 Jan. 1992
10 p Filed 18 Jan. 1989

NASA CASE NUMBER → (NASA-CASE-ARC-11888-1; US-PATENT-5,079,082;
US PATENT APPLICATIONS → US-PATENT-APPL-SN-298149; US-PATENT-CLASS-428-307.7;
SERIAL NUMBERS US-PATENT-CLASS-428-325; US-PATENT-CLASS-428-446;
US-PATENT-CLASS-428-920; US-PATENT-CLASS-501-39;
US-PATENT-CLASS-501-54; INT-PATENT-CLASS-B32B-5/14)

AVAILABILITY SOURCE → Avail: US Patent and Trademark Office CSCL 11D ← COSATI CODE

A porous body of fibrous, low density silica-based insulation material is at least in part impregnated with a reactive boron oxide containing borosilicate glass frit, a silicon tetraboride fluxing agent and a molybdenum silicide emittance agent. The glass frit, fluxing agent and emittance agent are separately milled to reduce their particle size, then mixed together to produce a slurry in ethanol. The slurry is then applied to the insulation material and sintered to produce the porous body. ← ABSTRACT

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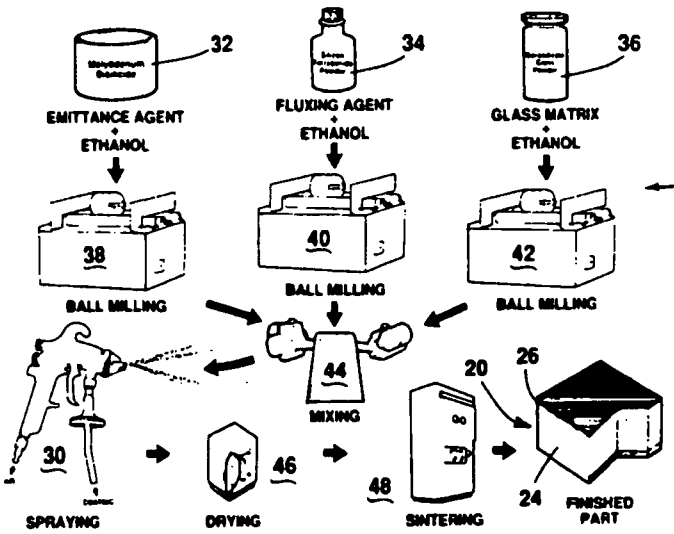


← KEY ILLUSTRATION

TABLE OF CONTENTS

Section 1 • Abstracts

N.A.—no abstracts were assigned to this category for this issue.

CHEMISTRY AND MATERIALS

ENGINEERING For related information see also *Physics.*

GEOSCIENCES For related information see also *Space Sciences.*

LIFE SCIENCES

MATHEMATICAL AND COMPUTER SCIENCES

PHYSICS For related information see also *Engineering.*

SOCIAL SCIENCES

SPACE SCIENCES For related information see also *Geosciences.*

GENERAL

Includes aeronautical, astronautical, and space science related histories, biographies, and pertinent reports too broad for categorization; histories or broad overviews of NASA programs.

Section 2 • Indexes

JULY 1992 (Supplement 41)

NASA Patent Abstracts Bibliography

A Semiannual Publication of the National Aeronautics and Space Administration

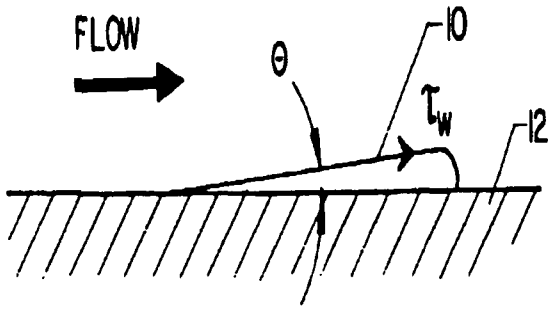
02
AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

N92-10008*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
REFLECTION TYPE SKIN FRICTION METER Patent Application
PROMODE R. BANDYOPADHYAY, inventor (to NASA) (AS&M, Inc., Hampton, VA.) and LEONARD M. WEINSTEIN, inventor (to NASA) 8 Aug. 1991 11 p
(NASA-CASE-LAR-14520-1-SB; NAS 1.71:LAR-14520-1-SB; US-PATENT-APPL-SN-743238) Avail: NTIS HC/MF A03 CSCL 01A

A housing block is provided having an upper surface conforming to the test surface of a model or aircraft. An oil film is supplied upstream of a transparent wedge window located in this upper surface by an oil pump system located external to the housing block. A light source located within the housing block supplies a light beam which passes through this transparent window and is reflected back through the transparent window by the upper surface of the oil film to a photo-sensitive position sensor located within the housing. This position sensor allows the slope history of the oil film caused by and aerodynamic flow to be determined. The skin friction is determined from this slope history. Internally located mirrors augment and sensitize the reflected beam as necessary before reaching the position sensor. In addition, a filter may be provided before this sensor to filter the beam.

NASA



N92-21588* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
MULTI-COLORED LAYERS FOR VISUALIZING AERODYNAMIC FLOW EFFECTS Patent
RONALD N. JENSEN, inventor (to NASA) 10 Dec. 1991 3 p Filed 3 Dec. 1990 Supersedes N91-16999 (29 - 9, p 1273)
(NASA-CASE-LAR-13742-1; US-PATENT-5,070,729; US-PATENT-APPL-SN-621144; US-PATENT-CLASS-73-147; US-PATENT-CLASS-116-201; US-PATENT-CLASS-116-207; INT-PATENT-CLASS-G01M-9/00) Avail: US Patent and Trademark Office CSCL 01A

A method is provided for visualizing aerodynamic flow effects on a test surface. First, discrete quantities of a sublimating chemical such as naphthalene are distinctively colored via appropriate dyes or paints. Next, a uniform layer of the sublimating chemical having a particular color is applied to the test surface. This layer is covered with a second uniform layer of a different colored sublimating chemical, and so on until a composite of multi-colored layers is formed having a discrete thickness. Friction caused by an airflow results in the distinctly colored layers being removed in proportion to such aerodynamic flow characteristics as velocity and temperature, resulting in a multi-colored portrait which approximates the air flow on the underlying test surface.

Official Gazette of the U.S. Patent and Trademark Office

05
AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

N92-21587* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SERRATED TRAILING EDGES FOR IMPROVING LIFT AND DRAG CHARACTERISTICS OF LIFTING SURFACES Patent
PAUL M. H. W. VIJGEN, inventor (to NASA), FLOYD G. HOWARD, inventor (to NASA), DENNIS M. BUSHNELL, inventor (to NASA), and BRUCE J. HOLMES, inventor (to NASA) 18 Feb. 1992 14 p Filed 31 Oct. 1989 Supersedes N90-15094 (28 - 7, p 879)
(NASA-CASE-LAR-13870-1-CU; US-PATENT-5,088,665; US-PATENT-APPL-SN-429516; US-PATENT-CLASS-244-200; US-PATENT-CLASS-244-198; US-PATENT-CLASS-244-212; US-PATENT-CLASS-244-215; INT-PATENT-CLASS-B64C-21/10) Avail: US Patent and Trademark Office CSCL 01C

An improvement in the lift and drag characteristics of a lifting surface is achieved by attaching a serrated panel to the trailing edge of the lifting surface. The serrations may have a saw-tooth configuration, with a 60 degree included angle between adjacent serrations. The serrations may vary in shape and size over the span-wise length of the lifting surface, and may be positioned at fixed or adjustable deflections relative to the chord of the lifting surface.

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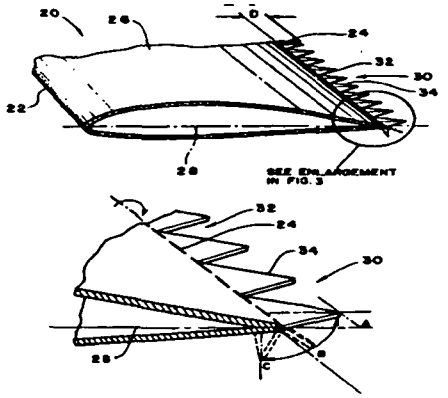
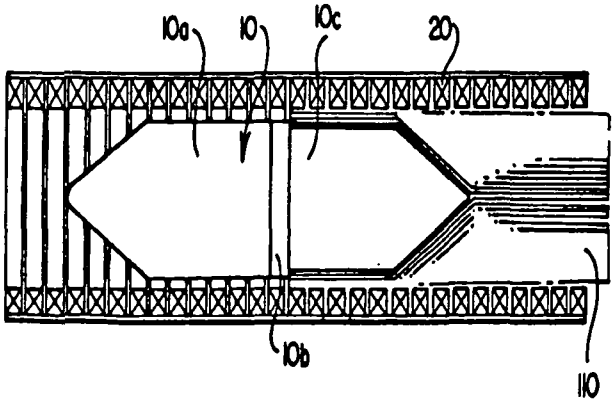


14
GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

N92-15081* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
ELECTROMAGNETIC MEISSNER EFFECT LAUNCHER Patent
GLEN A. ROBERTSON, inventor (to NASA) 21 May 1991 9 p Filed 31 Oct. 1989
(NASA-CASE-MFS-28323-1; US-PATENT-5,017,549; US-PATENT-APPL-SN-429515; US-PATENT-CLASS-505-1; US-PATENT-CLASS-89-8; US-PATENT-CLASS-124-3; US-PATENT-CLASS-244-63; INT-PATENT-CLASS-F41B-6/00) Avail: US Patent and Trademark Office CSCL 14B

An electromagnetic projectile launcher provides acceleration of a superconducting projectile through the diamagnetic repulsion of the superconducting projectile. A superconducting layer is provided aft of the projectile, either directly on the projectile or on a platform upon which the projectile is carried, and a traveling magnetic field is caused to propagate along a magnetic field drive coil in which the projectile is disposed. The resulting diamagnetic repulsion between the superconducting projectile and the traveling magnetic field causes the projectile to be propelled along the coil. In one embodiment, a segmented drive coil is used to generate the traveling magnetic field.
Official Gazette of the U.S. Patent and Trademark Office

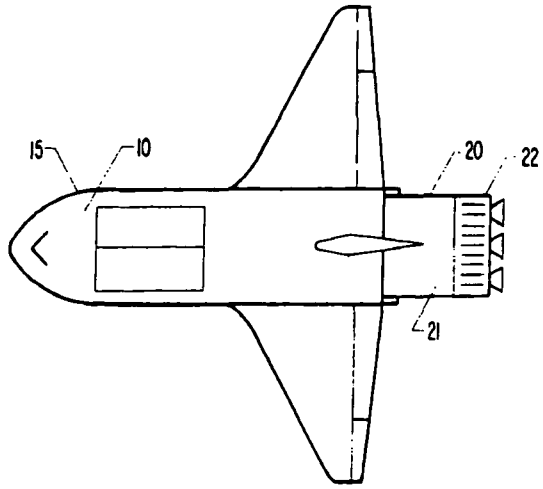


16
SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques.

N92-10035*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SHUTTLE ORBITER WITH TELESCOPING MAIN PROPULSION UNIT AND PAYLOAD Patent Application
IAN O. MACCONOCHIE, inventor (to NASA) 7 Aug. 1991 12 p
(NASA-CASE-LAR-13586-1; NAS 1.71:LAR-13586-1; US-PATENT-APPL-SN-743469) Avail: NTIS HC/MF A03 CSCL 22B

An improved Space Shuttle with variable internal volume is provided. The Space Shuttle Orbiter includes a telescoping main propulsion unit. This main propulsion unit contains the main rocket engines and fuel tanks and telescopes into the Space Shuttle. A variable cavity is located between this unit and the crew compartment. Accordingly, the positioning of the telescoping main propulsion unit determines the volume of the variable cavity. Thus, the volume of the variable length of the entire Space Shuttle may be increased or decreased to achieve desired configurations for optimal storage. In one embodiment of the invention, the payload also telescopes within the variable cavity.
NASA



N92-16007* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
LOAD LIMITING ENERGY ABSORBING LIGHTWEIGHT DEBRIS CATCHER Patent
JON B. KAHN, inventor (to NASA) and WILLIAM C. SCHNEIDER, inventor (to NASA) 10 Dec. 1991 11 p Filed 22 Feb. 1991 Supersedes N91-24216 (29 - 16, p 2564)
(NASA-CASE-MSC-21562-1; US-PATENT-5,071,091; US-PATENT-APPL-SN-658911; US-PATENT-CLASS-244-121; US-PATENT-CLASS-244-129.4; US-PATENT-CLASS-244-158R; INT-PATENT-CLASS-B64G-1/14) Avail: US Patent and Trademark Office CSCL 22B

In the representative embodiment of the invention disclosed, a load limiting, energy absorbing net is arranged to overlay a normally-covered vent opening in the rear bulkhead of the space orbiter vehicle. Spatially-disposed flexible retainer straps are extended from the net and respectively secured to bulkhead brackets spaced around the vent opening. The intermediate portions of the straps are doubled over and stitched together in a pattern enabling the doubled-over portions to progressively separate at a predicable load designed to be well below the tensile capability of the straps as the stitches are successively torn apart by the forces imposed on the retainer members whenever the cover plate is explosively separated from the bulkhead and propelled into the net. By arranging these stitches to be successively torn away at a load below the strap strength in response to forces acting on the retainers that are less than the combined strength of the retainers, this tearing action serves as a

predictable compact energy absorber for safely halting the cover plate as the retainers are extended as the net is deployed. The invention further includes a block of an energy-absorbing material positioned in the net for receiving loose debris produced by the explosive release of the cover plate.

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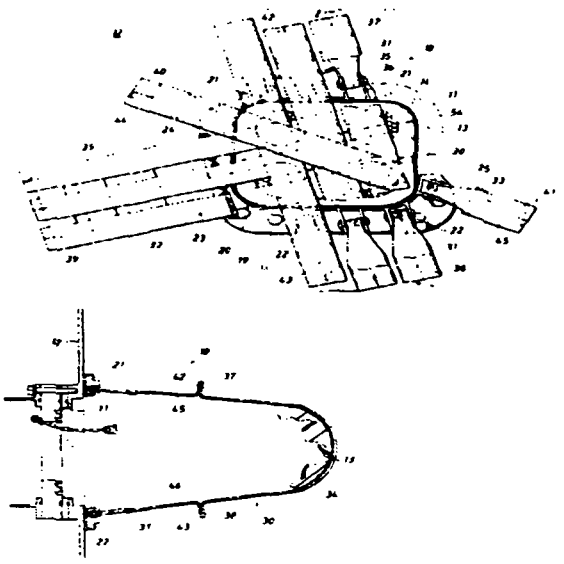

18

SPACECRAFT DESIGN,TESTING AND PERFORMANCE

Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls.

N92-15114* National Aeronautics and Space Administration. *Lyndon B. Johnson Space Center, Houston, TX.*
HYPERVELOCITY IMPACT SHIELD Patent
BURTON G. COUR-PALAIS, inventor (to NASA) and JEANNE LEE CREWS, inventor (to NASA) 26 Nov. 1991 12 p Filed 30 Apr. 1990 Supersedes N90-26858 (28 - 21, p 2966)
(NASA-CASE-MSC-21420-1; US-PATENT-5,067,388; US-PATENT-APPL-SN-516573; US-PATENT-CLASS-89-36.02; US-PATENT-CLASS-89-36.11; US-PATENT-CLASS-244-158R; INT-PATENT-CLASS-F41H-5/04) Avail: US Patent and Trademark Office CSCL 22B

A hypervelocity impact shield and method for protecting a wall structure, such as a spacecraft wall, from impact with particles of debris having densities of about 2.7 g/cu cm and impact velocities up to 16 km/s are disclosed. The shield comprises a stack of ultra thin sheets of impactor disrupting material supported and arranged by support means in spaced relationship to one another and mounted to cover the wall in a position for intercepting the particles. The sheets are of a number and spacing such that the impacting particle and the resulting particulates of the impacting particle and sheet material are successively impact-shocked to a thermal state of total melt and/or vaporization to a degree as precludes perforation of the wall. The ratio of individual sheet thickness to the theoretical diameter of particles of debris which may be of spherical form is in the range of 0.03 to 0.05. The spacing between adjacent sheets is such that the debris cloud plume of liquid and vapor resulting from an impacting particle penetrating a sheet does not puncture the next adjacent sheet prior to the arrival thereat of fragment particulates of sheet material and the debris particle produced by a previous impact.

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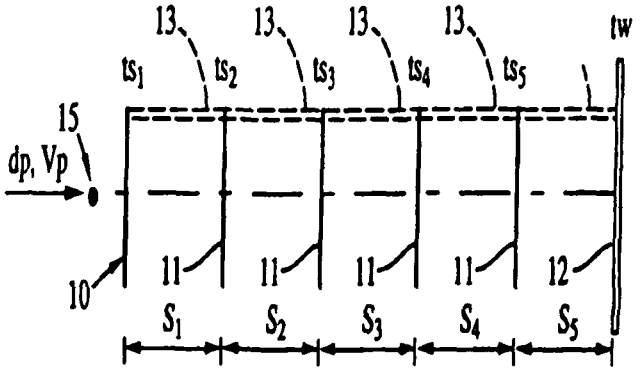

N92-21999* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
ASSURED CREW RETURN VEHICLE Patent
CHRISTOPHER J. CERIMELE, inventor (to NASA), ROBERT C. RIED, inventor (to NASA), WAYNE L. PETERSON, inventor (to NASA), GEORGE A. ZUPP, JR., inventor (to NASA), MICHAEL J. STAGNARO, inventor (to NASA), and BRIAN P. ROSS, inventor (to NASA) 12 Nov. 1991 54 p Filed 28 Dec. 1989
(NASA-CASE-MSC-21536-1; NAS 1.71:MSC-21536-1; US-PATENT-5,064,151; US-PATENT-APPL-SN-458476; US-PATENT-CLASS-244-160; US-PATENT-CLASS-244-163; US-PATENT-CLASS-244-162; INT-PATENT-CLASS-B64G-1/62)
US Patent and Trademark Office CSCL 22B

A return vehicle is disclosed for use in returning a crew to Earth from low earth orbit in a safe and relatively cost effective manner. The return vehicle comprises a cylindrically-shaped crew compartment attached to the large diameter of a conical heat shield having a spherically rounded nose. On-board inertial navigation and cold gas control systems are used together with a de-orbit propulsion system to effect a landing near a preferred site on the surface of the Earth. State vectors and attitude data are loaded from the attached orbiting craft just prior to separation vehicle.

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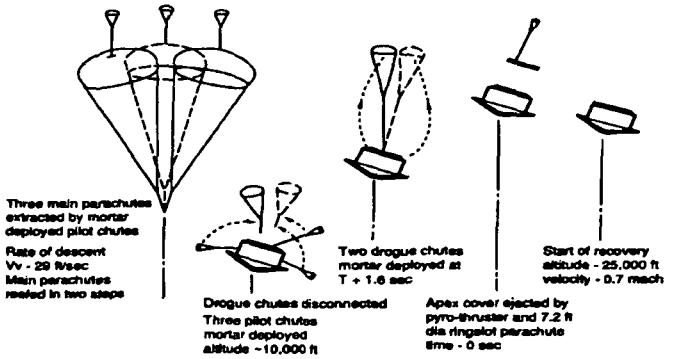

20
SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

N92-10054* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
EXTENDED TEMPERATURE RANGE ROCKET INJECTOR Patent
STEVEN J. SCHNEIDER, inventor (to NASA) 8 Oct. 1991
5 p Filed 30 Nov. 1989 Supersedes N90-15130 (28 - 7 p 887)
(NASA-CASE-LEW-14846-1; US-PATENT-5,054,287;
US-PATENT-APPL-SN-443523; US-PATENT-CLASS-60-240;
US-PATENT-CLASS-60-258; US-PATENT-CLASS-60-39.281;
INT-PATENT-CLASS-F02R-9/52) Avail: US Patent and Trademark Office CSCL 21H

A rocket injector is provided with multiple sets of manifolds for supplying propellants to injector elements. Sensors transmit the temperatures of the propellants to a suitable controller which is operably connected to valves between these manifolds and propellant storage tanks. When cryogenic propellant temperatures are sensed, only a portion of the valves are opened to furnish propellants to some of the manifolds. When lower temperatures are sensed, additional valves are opened to furnish propellants to more of the manifolds.

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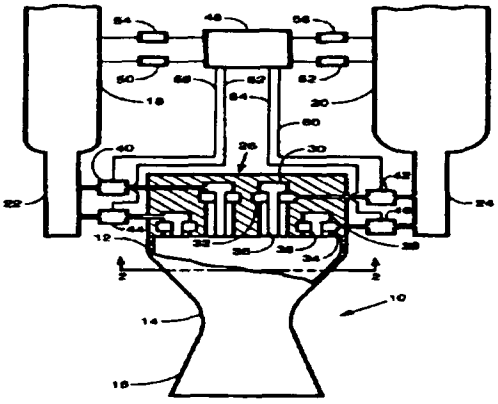

N92-15122* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHOD FOR PROVIDING REAL-TIME CONTROL OF A GASEOUS PROPELLANT ROCKET PROPULSION SYSTEM Patent
BRIAN G. MORRIS, inventor (to NASA) 12 Nov. 1991
14 p Filed 26 Jan. 1990 Supersedes N90-26073 (28 - 20, p 2825)
(NASA-CASE-MSC-21542-1; US-PATENT-5,063,734;
US-PATENT-APPL-SN-470480; US-PATENT-CLASS-60-204;
US-PATENT-CLASS-60-240; US-PATENT-CLASS-60-243;
US-PATENT-CLASS-60-259; INT-PATENT-CLASS-F02K-9/58)
Avail: US Patent and Trademark Office CSCL 21H

The new and improved methods and apparatus disclosed provide effective real-time management of a spacecraft rocket engine powered by gaseous propellants. Real-time measurements representative of the engine performance are compared with predetermined standards to selectively control the supply of propellants to the engine for optimizing its performance as well as efficiently managing the consumption of propellants. A priority system is provided for achieving effective real-time management of the propulsion system by first regulating the propellants to keep the engine operating at an efficient level and thereafter regulating the consumption ratio of the propellants. A lower priority level is provided to balance the consumption of the propellants so significant quantities of unexpended propellants will not be left over at the end of the scheduled mission of the engine.

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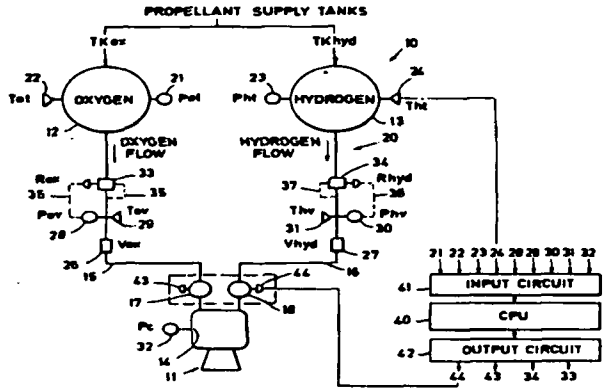


23
CHEMISTRY AND MATERIALS (GENERAL)

N92-10066*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
POLY 1, 2, 4-TRIAZOLES VIA AROMATIC NUCLEOPHILIC DISPLACEMENT Patent Application
JOHN W. CONNELL, inventor (to NASA), PAUL M. HERGENROTHER, inventor (to NASA), and PETER WOLF, inventor (to NASA) (Badische Anilin- und Soda-Fabrik A.G., Mogendorf, Germany, F.R.) 24 Jan. 1991 17 p
(NASA-CASE-LAR-14440-1; NAS 1.71:LAR-14440-1;
US-PATENT-APPL-SN-650336) Avail: NTIS HC/MF A03 CSCL 07A

The primary object of this invention constitutes new compositions of matter and a new process to prepare poly(1,2,4-triazoles) (PT). It concerns new PT, novel monomers, and the process for preparing the same. Another object of the present invention is to provide new PT that are useful as composite matrix resins for aircraft and dielectric interlayers in electronic devices. Another object of the present invention is the composition of several new di(hyproxyphenyl)-1,2,4-triazole monomers. According to the present invention, the foregoing and additional objects were obtained by synthesizing PT by the nucleophilic displacement reaction of di(hydroxyphenyl)-1,2,4-triazole monomers with activated aromatic dihalides. The inherent viscosities of the PT ranged from 1.37 to 3.4 dL/g and the glass transition temperatures ranged from 192 to 216 C. One polymer exhibited a crystalline melting temperature of 377 C. Thermogravimetric analysis (TGA) showed no weight loss occurring below 300 C in air or nitrogen with a 5 percent weight loss occurring at approximately 500 C in air and nitrogen. The synthesis of the

di(hydroxphenyl)-1,2,4-triazole monomer is represented in an equation. The monomer can be prepared by either of the two routes shown. The chemistry can easily be extended to prepare similar di(hydroxyphenyl)-1,2,4-triazole monomers as shown in a second equation. The aromatic dihydrazides in some cases are commercially available or readily prepared from hydrazine and a di(acid chloride). The substitution of the hydroxy groups in either type of monomer may be meta-meta, para-para, or para-meta. The general reaction sequence of PT from each type of di(hydroxyphenyl)-1,2,4-triazole monomer is shown in equations 3 and 4.

NASA

N92-17882*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

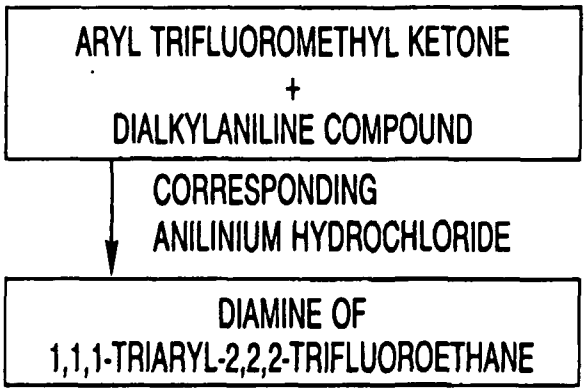
SUBSTITUTED 1,1,1-TRIARYL-2,2,2-TRIFLUOROETHANES AND PROCESSES FOR THEIR SYNTHESIS Patent Application

WILLIAM B. ALSTON, inventor (to NASA) and ROY F. GRATZ, inventor (to NASA) (Mary Washington Coll., Fredricksburg, VA.) 17 Jan. 1992 24 p

(NASA-CASE-LEW-14345-6; NAS 1.71:LEW-14345-6; US-PATENT-APPL-SN-822240) Avail: NTIS HC/MF A03 CSCL 07A

Synthetic procedures are given for tetraalkyl, tetraacid and dianhydrides substituted 1,1,1-triaryl-2,2,2-trifluoroethanes which comprises: (1) 1,1-bis (dialkylaryl) 1-aryl-2,2,2 trifluoroethane; (2) 1,1-bis (dicarboxyaryl) 1-aryl-2,2,2 trifluoroethane; or (3) cyclic dianhydride or diamine of 1,1-bis (dialkylaryl) 1-aryl-2,2,2 trifluoroethanes. The synthesis of (1) is accomplished by the condensation reaction of an aryltrifluoromethyl ketone with a dialkylaryl compound. The synthesis of (2) is accomplished by oxidation of (1). The synthesis dianhydride of (3) is accomplished by the conversion of (2) to its corresponding cyclic dianhydride. The synthesis of the diamine is accomplished by the similar reaction of an aryltrifluoromethyl ketone with aniline or alkyl substituted or disubstituted anilines. Also, other derivatives of the above are formed by nucleophilic displacement reactions.

NASA



24
COMPOSITE MATERIALS

Includes physical, chemical, and mechanical properties of laminates and other composite materials.

N92-10070* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

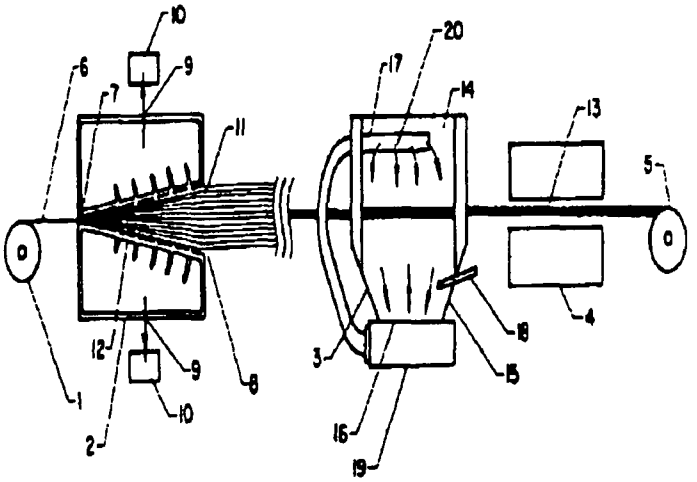
PROCESS FOR APPLICATION OF POWDER PARTICLES TO FILAMENTARY MATERIALS Patent

ROBERT M. BAUCOM, inventor (to NASA), JOHN J. SNOHA, inventor (to NASA), and JOSEPH M. MARCHELLO, inventor (to NASA) 15 Oct. 1991 8 p Filed 16 May 1990 Supersedes N91-28290 (29 - 20, p 3305)

(NASA-CASE-LAR-14231-1; US-PATENT-5,057,338; US-PATENT-APPL-SN-524109; US-PATENT-CLASS-427-185; US-PATENT-CLASS-427-195; US-PATENT-CLASS-427-375; US-PATENT-CLASS-118-DIG.5; US-PATENT-CLASS-156-166; US-PATENT-CLASS-156-283; INT-PATENT-CLASS-B05D-1/24) Avail: US Patent and Trademark Office CSCL 11D

This invention is a process for the uniform application of polymer powder particles to a filamentary material in a continuous manner to form a uniform composite prepreg material. A tow of the filamentary material is fed under carefully controlled tension into a spreading unit, where it is spread pneumatically into an even band. The spread filamentary tow is then coated with polymer particles from a fluidized bed, after which the coated filamentary tow is fused before take-up on a package for subsequent utilization. This process produces a composite prepreg uniformly without imposing severe stress on the filamentary material, and without requiring long, high temperature residence times for the polymer.

Official Gazette of the U.S. Patent and Trademark Office



N92-16025* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

METHOD OF INTERCALATING LARGE QUANTITIES OF FIBROUS STRUCTURES Patent

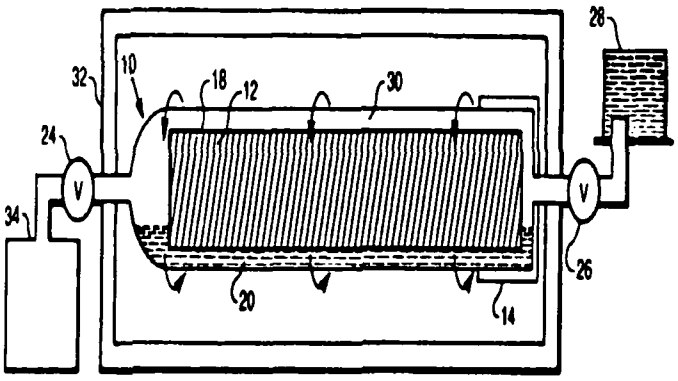
JAMES R. GAIER, inventor (to NASA) 17 Dec. 1991 7 p Filed 2 Nov. 1990

(NASA-CASE-LEW-15077-1; US-PATENT-5,073,412; US-PATENT-APPL-SN-608493; US-PATENT-CLASS-427-294; US-PATENT-CLASS-118-416; US-PATENT-CLASS-252-502; US-PATENT-CLASS-423-447.2; US-PATENT-CLASS-423-448; US-PATENT-CLASS-423-460; US-PATENT-CLASS-427-443.2) Avail: US Patent and Trademark Office CSCL 11D

A method of intercalating large quantities of fibrous structures uses a rotatable reaction chamber containing a liquid phase intercalate. The intercalate liquid phase is controlled by appropriately heating, cooling, or pressurizing the reaction. Rotation of the chamber containing the fiber sample enables total submergence of the fiber during intercalation. Intercalated graphite

fibers having metal-like resistivities are achieved and are conceivably useful as electrical conductors.

Official Gazette of the U.S. Patent and Trademark Office



N92-16026* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.

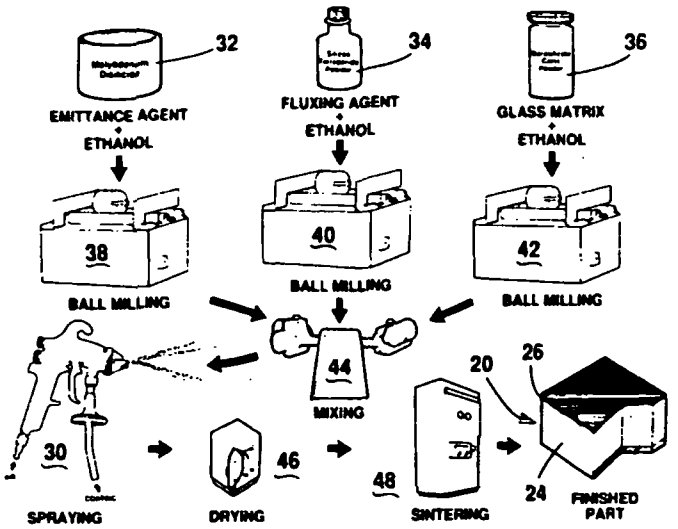
TOUGHENED UNI-PIECE FIBROUS INSULATION Patent

DANIEL B LEISER, inventor (to NASA), MARNELL SMITH, inventor (to NASA), REX A. CHURCHWARD, inventor (to NASA), and VICTOR W. KATVALA, inventor (to NASA) 7 Jan. 1992 10 p Filed 18 Jan. 1989

(NASA-CASE-ARC-11888-1; US-PATENT-5,079,082; US-PATENT-APPL-SN-298149; US-PATENT-CLASS-428-307.7; US-PATENT-CLASS-428-325; US-PATENT-CLASS-428-446; US-PATENT-CLASS-428-920; US-PATENT-CLASS-501-39; US-PATENT-CLASS-501-54; INT-PATENT-CLASS-B32B-5/14) Avail: US Patent and Trademark Office CSCL 11D

A porous body of fibrous, low density silica-based insulation material is at least in part impregnated with a reactive boron oxide containing borosilicate glass frit, a silicon tetraboride fluxing agent and a molybdenum silicide emittance agent. The glass frit, fluxing agent and emittance agent are separately milled to reduce their particle size, then mixed together to produce a slurry in ethanol. The slurry is then applied to the insulation material and sintered to produce the porous body.

Official Gazette of the U.S. Patent and Trademark Office



N92-17861*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

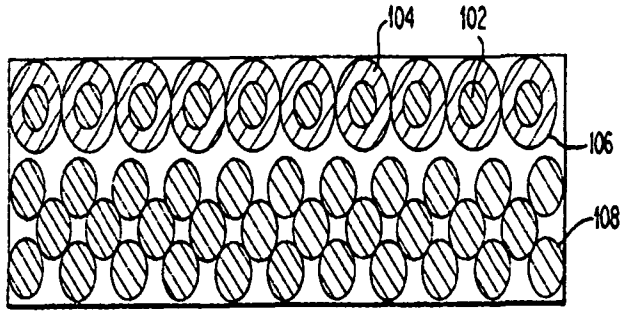
INTERCALATED HYBRID GRAPHITE FIBER COMPOSITE Patent Application

JAMES R. GAIER, inventor (to NASA) 25 Nov. 1991 13 p

(NASA-CASE-LEW-15241-1; NAS 1.71:LEW-15241-1; US-PATENT-APPL-SN-798464) Avail: NTIS HC/MF A03 CSCL 11D

The invention is directed to a highly conductive lightweight hybrid material and methods of producing the same. The hybrid composite is obtained by weaving strands of a high strength carbon or graphite fiber into a fabric-like structure, depositing a layer of carbon onto the structure, heat treating the structure to graphitize the carbon layer, and intercalating the graphitic carbon layer structure. A laminate composite material useful for protection against lightning strikes comprises at least one layer of the hybrid material over at least one layer of high strength carbon or graphite fibers. The composite material of the present invention is compatible with matrix compounds, has a coefficient of thermal expansion which is the same as underlying fiber layers, and is resistant to galvanic corrosion in addition to being highly conductive. These materials are useful in the aerospace industry, in particular as lightning strike protection for airplanes.

NASA



N92-17870*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

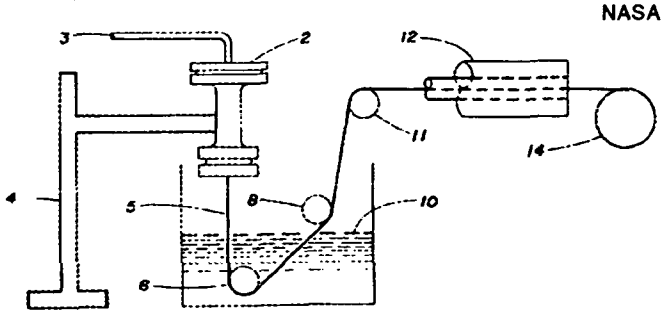
PRODUCTION OF MULLITE FIBERS Patent Application

DENNIS S. TUCKER, inventor (to NASA) and J. SCOTT SPARKS, inventor (to NASA) 23 Dec. 1991 15 p

(NASA-CASE-MFS-28431-1; NAS 1.71:MFS-28431-1; US-PATENT-APPL-SN-812084) Avail: NTIS HC/MF A03 CSCL 11D

Disclosed here is a process for making mullite fibers wherein a hydrolyzable silicon compound and an aluminum compound in the form of a difunctional aluminum chelate are hydrolyzed to form sols using water and an alcohol with a catalytic amount of hydrochloric acid. The sols are mixed in a molar ratio of aluminum to silicon of 3 to 1 and, under polycondensation conditions, a fibrous gel is formed. From this gel the mullite fibers can be produced.

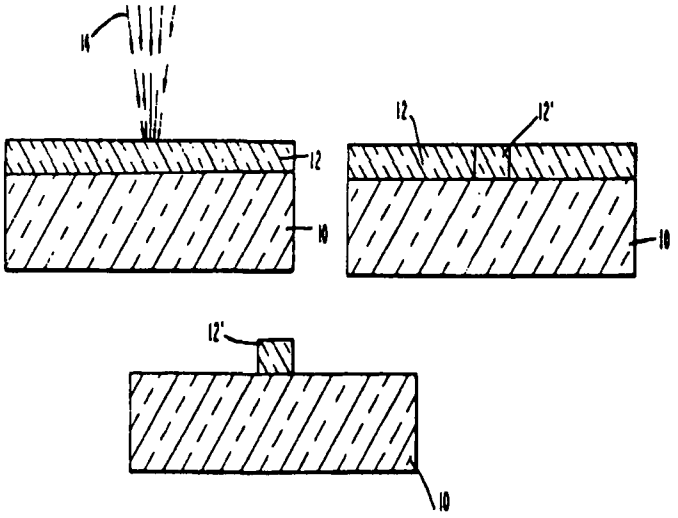
NASA



N92-18561* National Aeronautics and Space Administration. Pasadena Office, CA.
FABRICATION OF NANOMETER SINGLE CRYSTAL METALLIC COSI2 STRUCTURES ON SI Patent
KAI-WEI NIEH, *inventor (to NASA)*, TRUE-LON LIN, *inventor* (to NASA), and ROBERT W. FATHAUER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 24 Dec. 1991 6 p Filed 27 Mar. 1991 Continuation of abandoned US-Patent-Appl-SN-392166, filed 10 Aug. 1989 (NASA-CASE-NPO-17736-2-CU; US-PATENT-5,075,243; US-PATENT-APPL-SN-677373; US-PATENT-APPL-SN-392166; US-PATENT-CLASS-437-40; US-PATENT-CLASS-437-973; US-PATENT-CLASS-437-935; US-PATENT-CLASS-437-942; US-PATENT-CLASS-437-907; US-PATENT-CLASS-437-200) Avail: US Patent and Trademark Office CSCL 11D

Amorphous Co:Si (1:2 ratio) films are electron gun-evaporated on clean Si(111), such as in a molecular beam epitaxy system. These layers are then crystallized selectively with a focused electron beam to form very small crystalline Co/Si2 regions in an amorphous matrix. Finally, the amorphous regions are etched away selectively using plasma or chemical techniques.

Official Gazette of the U.S. Patent and Trademark Office



N92-21725* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
COMPOSITE THERMAL BARRIER COATING Patent
ISIDOR ZAPLATYNSKY, inventor (to NASA) 14 Jan. 1992 4 p Filed 31 Jul. 1990 Supersedes N91-13500 (29 - 5, p 632) (NASA-CASE-LEW-14999-1; US-PATENT-5,080,977; US-PATENT-APPL-SN-560926; US-PATENT-CLASS-428-432; US-PATENT-CLASS-428-212; US-PATENT-CLASS-428-213; US-PATENT-CLASS-428-426; US-PATENT-CLASS-428-433; US-PATENT-CLASS-428-469; US-PATENT-CLASS-428-472.2) Avail: US Patent and Trademark Office CSCL 11D

A composite thermal barrier coating for a substrate is presented. The coating is comprised of a first layer that includes a ceramic material and a second layer that includes a ceramic material impregnated with glass. The glass is a ternary eutectic. The glass consists of about 14.6 weight percent Al203, about 23.3 weight percent CaO, and about 62.1 weight percent SiO2. The ceramic materials may include yttria-stabilized zirconia.

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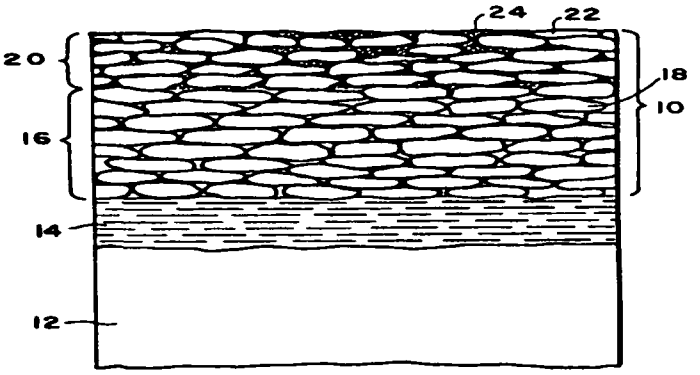


25
INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

N92-10073* National Aeronautics and Space Administration. Pasadena Office, CA.
REGENERATIVE CU/LA ZEOLITE SUPPORTED DESULFURIZING SORBENTS Patent
GERALD E. VOECKS, inventor (to NASA) and PRAMOD K. SHARMA, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 15 Oct. 1991 8 p Filed 12 Apr. 1990 Supersedes N90-26098 (28 - 20, p 2830) (NASA-CASE-NPO-17480-1-CU; US-PATENT-5,057,473; US-PATENT-APPL-SN-508386; US-PATENT-CLASS-502-73; INT-PATENT-CLASS-B01J-29/10) Avail: US Patent and Trademark Office CSCL 07D

Efficient, regenerable sorbents for removal of H2S from fluid hydrocarbons such as diesel fuel at moderate condition comprise a porous, high surface area aluminosilicate support, suitably a synthetic zeolite, and most preferably a zeolite having a free lattice opening of at least 6 Angstroms containing from 0.1 to 0.5 moles of copper ions, lanthanum ions or their mixtures. The sorbent removes sulfur from the hydrocarbon fuel in high efficiency and can be repetitively regenerated without loss of activity.

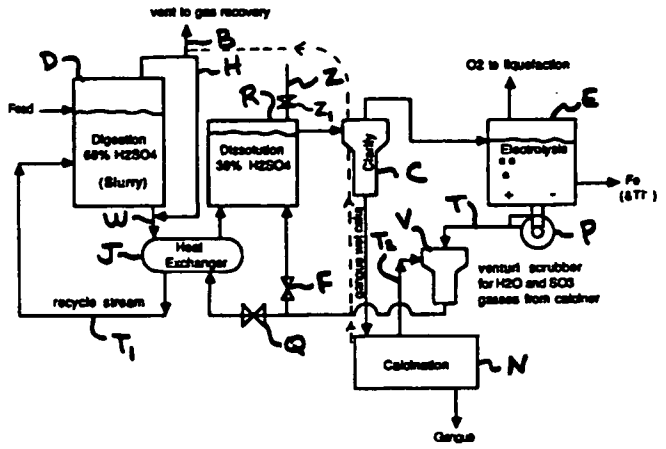
Official Gazette of the U.S. Patent and Trademark Office

N92-12079*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHOD FOR PRODUCING OXYGEN FROM LUNAR MATERIALS Patent Application
THOMAS A. SULLIVAN, inventor (to NASA) 24 Sep. 1991 29 p (NASA-CASE-MSC-21759-1; NAS 1.71:MSC-21759-1; US-PATENT-APPL-SN-746581) Avail: NTIS HC/MF A03 CSCL 07D

This invention is related to producing oxygen from lunar or Martian materials, particularly from lunar ilmenite in situ. The process includes producing a slurry of the minerals and hot sulfuric acid, the acid and minerals reacting to form sulfates of the metal. Water is added to the slurry to dissolve the minerals into an

aqueous solution, the first aqueous solution is separated from unreacted minerals from the slurry, and the aqueous solution is electrolyzed to produce the metal and oxygen.

NASA



N92-16043* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PROCESSING FOR MAXIMIZING THE LEVEL OF CRYSTALLINITY IN LINEAR AROMATIC POLYIMIDES Patent
TERRY L. ST.CLAIR, inventor (to NASA) 29 Oct. 1991 20 p Filed 30 Apr. 1990 Continuation-in-part of US-Patent-Appl-SN-035430, filed 7 Apr. 1987
(NASA-CASE-LAR-14481-1; US-PATENT-5,061,783; US-PATENT-APPL-SN-516489; US-PATENT-APPL-SN-035430; US-PATENT-CLASS-528-125; US-PATENT-CLASS-528-126; US-PATENT-CLASS-528-128; US-PATENT-CLASS-528-172; US-PATENT-CLASS-528-173; US-PATENT-CLASS-528-179)
Avail: US Patent and Trademark Office CSCL 07D

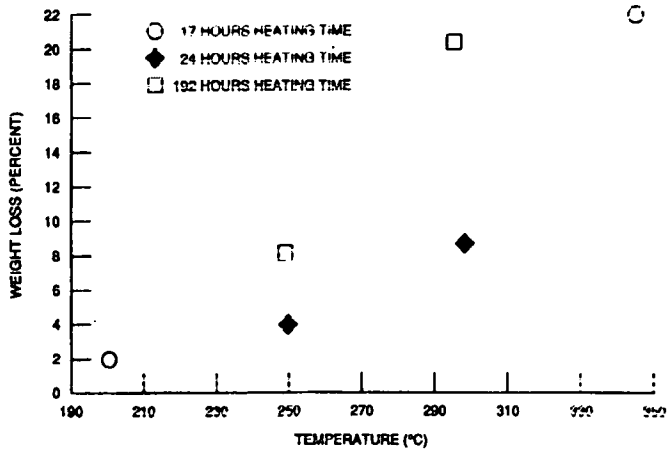
The process of the present invention includes first treating a polyamide acid (such as LARC-TPI polyamide acid) in an amide-containing solvent (such as N-methyl pyrrolidone) with an aprotic organic base (such as triethylamine), followed by dehydrating with an organic dehydrating agent (such as acetic anhydride). The level of crystallinity in the linear aromatic polyamide so produced is maximized without any degradation in the molecular weight thereof.

Official Gazette of the U.S. Patent and Trademark Office

N92-17902*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
STORING FLUORINE GAS IN CARBON FIBERS AND RELEASING THE SAME Patent Application
CHING-CHEH HUNG, inventor (to NASA) 26 Nov. 1991 14 p
(NASA-CASE-LEW-15359-1; NAS 1.71:LEW-15359-1; US-PATENT-APPL-SN-797484) Avail: NTIS HC/MF A03 CSCL 07D

Fluorine gas stored in pitch-based graphitized carbon fibers is released by heating to a temperature between 250 C and 400 C. The fluorine is then used to conduct fluorination reactions.

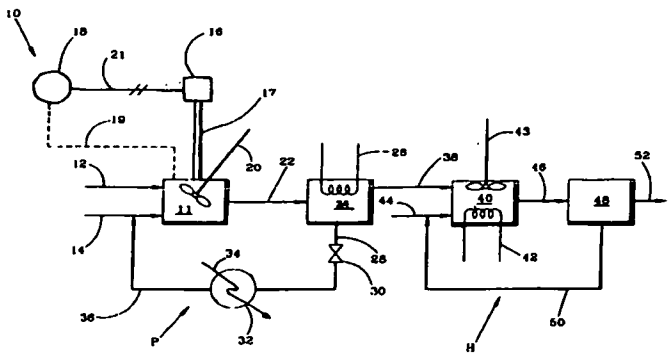
NASA



N92-19486*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
APPARATUS AND METHOD FOR CELLULOSE PROCESSING USING MICROWAVE PRETREATMENT Patent Application
HATICE S. CULLINGFORD, CLIFFORD E. GEORGE, and GEORGE R. LIGHTSEY (Lightsey, George R., Starkville, MS) 5 Jul. 1991 18 p
(NASA-CASE-MSC-21936-1; NAS 1.71:MSC-21936-1; US-PATENT-APPL-SN-728901) Avail: NTIS HC/MF A03 CSCL 07D

A method for pretreating a cellulosic waste product with microwaves is disclosed as well as a method and apparatus for converting cellulosic waste into soluble saccharides. The invention greatly enhances a reaction rate for enzymatic hydrolysis. A feed mixture of cellulose, water, and acetic acid are irradiated with microwaves at a superatmospheric pressure in an autoclave reaction vessel and the treated cellulose is enzymatically hydrolyzed in a bioreactor. The acid and enzymes are optionally separated for reuse. As a feed stock for the culture of microbes, the sugars can be further processed into ethanol or food protein. High yield, low hazard potential, low energy usage and ready preparation in space of acetic acid and the enzyme makes the present invention well suited for use on long duration space missions.

NASA



27
NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N92-10090* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
BROMINATED GRAPHITIZED CARBON FIBERS Patent
CHING-CHEH HUNG, inventor (to NASA) 22 Oct. 1991 83 p Filed 30 Nov. 1989 Supersedes N90-15262 (28 - 7, p 910) Continuation-in-part of abandoned US-Patent-Appl-SN-219016, filed 14 Jul. 1988
(NASA-CASE-LEW-14698-2; US-PATENT-5,059,409; US-PATENT-APPL-SN-443289; US-PATENT-APPL-SN-219016; US-PATENT-CLASS-423-448; US-PATENT-CLASS-423-439; US-PATENT-CLASS-423-460; US-PATENT-CLASS-252-502; INT-PATENT-CLASS-C01B-31/04) Avail: US Patent and Trademark Office CSCL 11C

Low cost, high break elongation graphitized carbon fibers having low degree of graphitization are inert to bromine at room or higher temperatures, but are brominated at -7 to 20 C, and then debrominated at ambient. Repetition of this bromination-debromination process can bring the bromine content to 18 percent. Electrical conductivity of the brominated fibers is three times of the before-bromination value.

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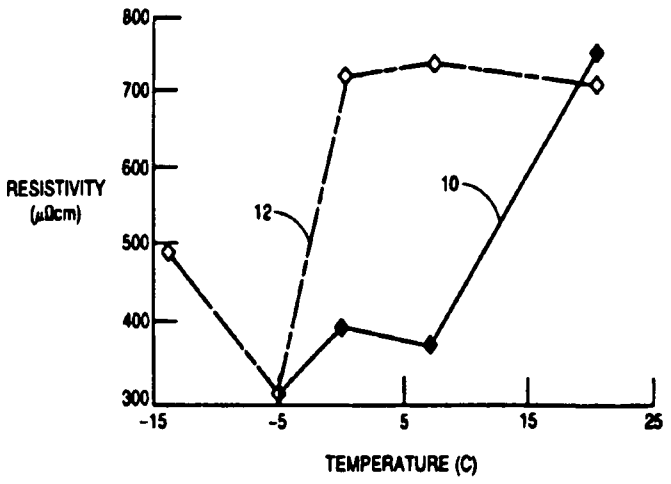

N92-10091* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
HELMET OF A LAMINATE CONSTRUCTION OF POLYCARBONATE AND POLYSULFONE POLYMERIC MATERIAL Patent
JOSEPH J. KOSMO, inventor (to NASA) and FREDERIC S. DAWN, inventor (to NASA) 15 Oct. 1991 60 p Filed 30 Nov. 1989 Supersedes N90-16925 (28 - 9, p 1195)
(NASA-CASE-MSC-21503-1; US-PATENT-5,056,156; US-PATENT-APPL-SN-443414; US-PATENT-CLASS-2-2.1A; US-PATENT-CLASS-2-411; US-PATENT-CLASS-2-424; US-PATENT-CLASS-428-412; US-PATENT-CLASS-428-419; US-PATENT-CLASS-428-458; US-PATENT-CLASS-428-215) Avail: US Patent and Trademark Office CSCL 11C

An article of laminate construction is disclosed which is comprised of an underlayer of polycarbonate polymer material to which is applied a chemically resistant outer layer of polysulfone. The layers which are joined by compression-heat molding, are molded to form the shape of a body protective shell such as a space helmet comprising a shell of polycarbonate, polysulfone laminate construction attached at its open end to a sealing ring adapted for connection to a space suit. The front portion of the shell provides a transparent visor for the helmet. An outer visor of polycarbonate polysulfone laminate construction is pivotally mounted to the sealing ring for covering the transparent visor portion of the shell during extravehicular activities. The polycarbonate under layer of the outer visor is coated on its inner surface with a vacuum deposit of gold to provide additional thermal radiation resistance.

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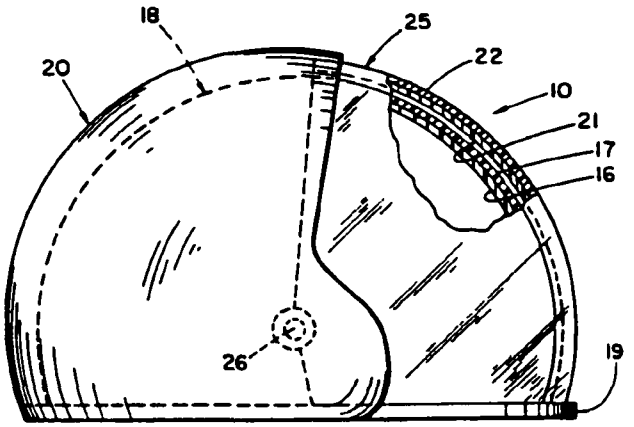


N92-10105*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A PROCESS FOR PREPARING 1,3-DIAMINO-5-PENTAFLUOROSULFANYLBENZENE AND POLYMERS THEREFROM Patent Application
ANNE K. ST.CLAIR, inventor (to NASA), TERRY L. ST.CLAIR, inventor (to NASA), and JOSEPH S. THRASHER, inventor (to NASA) (Alabama Univ., Huntsville.) 5 Sep. 1991 18 p
(NASA-CASE-LAR-14773-1-CU; NAS 1.71:LAR-14773-1; US-PATENT-APPL-SN-755207) Avail: NTIS HC/MF A03 CSCL 11C

Diamines have shown their utility in the formation of many polymers. Examples of these polymers include polyimides, polyamides, and epoxies. The properties of these polymers are often dependent on the diamine which is used to make the polymer. By the present invention, a process was developed to make a diamine containing pentafluorosulfanylbenzene moiety. This process involves two steps: the preparation of a dinitro precursor and the reduction of the dinitro compound to form the diamine. This diamine was then reacted with various dianhydrides, diacidchlorides, and epoxy resins to yield the corresponding polyamide, polyamide, and epoxy polymers. These polymers were then used to make films, a wire coating enamel, and a semi-permeable membrane. The novelty of this invention resides in the process to make the diamine. Traditionally, dinitro compounds are reduced with hydrazine or a catalyst such as palladium on

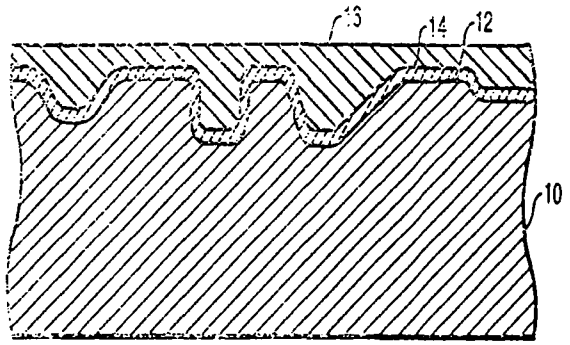
charcoal. The catalyst which is used in this invention is platinum oxide. When this catalyst is used, it makes it possible to form a polymer-grade diamine.

NASA

N92-11186*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
SOLID LUBRICANTS ON PRETREATED SURFACES Patent Application
ROBERT L. FUSARO, inventor (to NASA) 16 Sep. 1991 12 p
(NASA-CASE-LEW-14474-2; NAS 1.71:LEW-14474-2;
US-PATENT-APPL-SN-760670) Avail: NTIS HC/MF A03 CSCL 11C

A solid lubricant film on a pretreated surface is described. The surface topography of the material to be lubricated is first selectively altered. Photochemical etching is employed to selectively determine contact area and shape to maximize the proper ratio of reservoir area to sliding contact area. Cadmium oxide is then sputtered onto the altered surface. The cadmium oxide acts as an intermediate layer to more tightly bond the solid lubricant, such as graphite, onto the material surface.

NASA



N92-11198*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
POLYIMIDES WITH IMPROVED COMPRESSION MOLDABILITY Patent Application
PAUL M. HERGENROTHER, inventor (to NASA), STEPHEN J. HAVENS, inventor (to NASA), and MARK W. BELTZ, inventor (to NASA) (Akron Univ., OH.) 5 May 1990 18 p
(NASA-CASE-LAR-14457-1-CU; NAS 1.71:LAR-14457-1-CU;
US-PATENT-APPL-SN-520472) Avail: NTIS HC/MF A03 CSCL 11C

The semicrystalline polyamide prepared by reaction of 3,3',4,4' benzophenonetetracarboxylic (BTDA) and 1,3-bis(4-aminophenoxy 4' benzoyl) benzene (1,3-BABB) is modified so that it can be more readily processed to form adhesive bonds, moldings, and composites. The stoichiometric ratio of the two monomers, BTDA and 1,3-BABB is controlled so that the intermediate polyamide acid is of a calculated molecular weight. A polyamide acid with excess anhydride groups is then reacted with the stoichiometrically required amount of monofunctional aromatic or aliphatic amine required for complete endcapping. The stoichiometrically offset, encapped polyamide is processed at lower temperatures and pressures than the unmodified high molecular weight polyamide with the same repeat unit, and exhibits an improved melt stability.

NASA

N92-11199*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
LOW TOXICITY HIGH TEMPERATURE PMR POLYIMIDES Patent Application
RUTH H. PATER, inventor (to NASA) 5 Feb. 1991 39 p
(NASA-CASE-LAR-14639-1; NAS 1.71:LAR-14639-1;
US-PATENT-APPL-SN-651062) Avail: NTIS HC/MF A03 CSCL 11C

In-situ polymerization of monomer reactants (PMR) type polyimides constitute an important class of ultra high performance composite matrix resins. PMR-15 is the best known and most widely used PMR polyamide. An object of the present invention is to provide a substantially improved high temperature PMR-15 system that exhibits better processability, toughness, and thermo-oxidative stability than PMR-15, as well as having a low toxicity. Another object is to provide new PMR polyimides that are useful as adhesives, moldings, and composite matrices. By the present invention, a new PMR polyamide comprises a mixture of the following compounds: 3,4'-oxydianiline (3,4'-ODA), NE, and BTDE which are then treated with heat. This PMR was designated LaRC-RP46 and has a broader processing window, better reproducibility of high quality composite parts, better elevated temperature mechanical properties, and higher retention of mechanical properties at an elevated temperature, particularly, at 371 C.

NASA

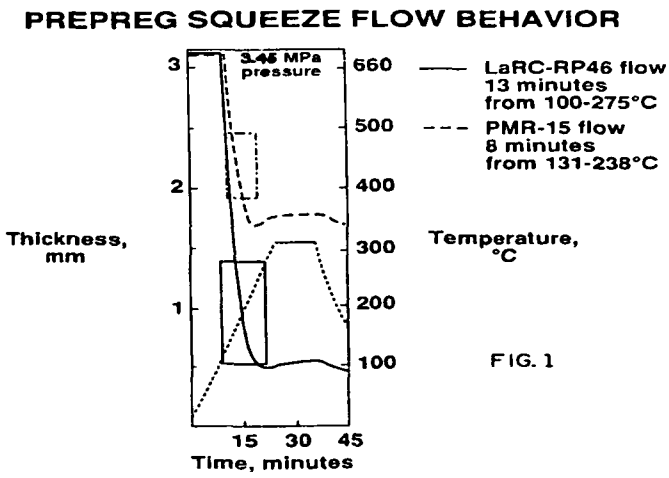


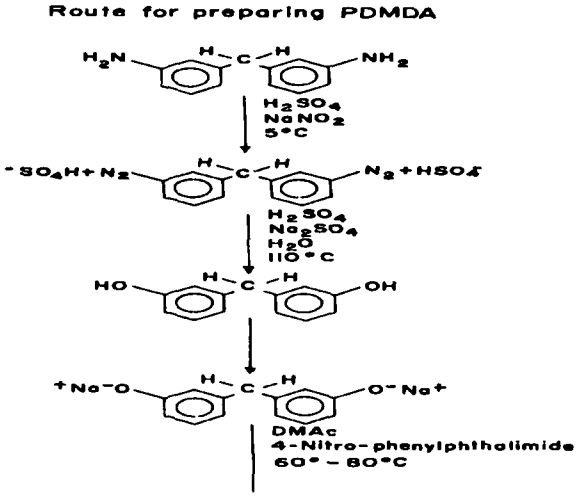
FIG. 1

N92-11200*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
DIPHENYLMETHANE-CONTAINING DIANHYDRIDE AND POLYIMIDES PREPARED THEREFROM Patent Application
ANNE K. ST.CLAIR, inventor (to NASA), HAROLD G. BOSTON, inventor (to NASA), and J. RICHARD PRATT, inventor (to NASA) (Lockheed Engineering and Sciences Co., Hampton, VA.) 26 Aug. 1991 22 p
(NASA-CASE-LAR-14487-1; NAS 1.71:LAR-14487-1;

US-PATENT-APPL-SN-750158) Avail: NTIS HC/MF A03 CSCL 11C

A high temperature stable, highly optically transparent to colorless, low dialectic linear aromatic polyamide is prepared by reacting an aromatic diamine with 3,ba'as (3,4-dicarboxyphenoxy) diphenylmethane dianhydride in an amide solvent to form a linear aromatic polyamic acid. This polyamic acid is then cyclized to form the corresponding polyamide. The general structural formula is given.

NASA



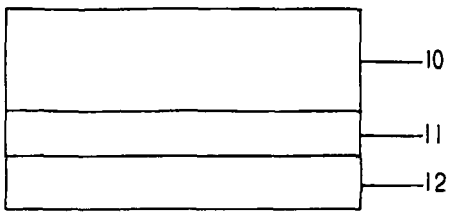
N92-11201*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A PROCESS FOR PREPARING AN ASSEMBLY OF AN ARTICLE AND A POLYAMIDE WHICH RESISTS DIMENSIONAL CHANGE, DELAMINATION, AND DEBONDING WHEN EXPOSED TO CHANGES IN TEMPERATURE Patent Application

DIANE M. STOAKLEY, inventor (to NASA) and ANNE K. ST.CLAIR, inventor (to NASA) 26 Jul. 1991 20 p (NASA-CASE-LAR-14538-1; NAS 1.71:LAR-14538-1; US-PATENT-APPL-SN-736880) Avail: NTIS HC/MF A01 CSCL 11C

An assembly of an article and a polyamide composition is prepared. The assembly resists dimensional change, delamination, or debonding when exposed to changes to temperature. An article is provided. A polyamic acid solution which yields a polyamide having a low coefficient of thermal expansion (CTE) was prepared. Equimolar quantities of an aromatic diamine and an aromatic dianhydride were reacted in a solvent medium to form a polyamic acid solution. A metal ion containing additive was added to the solution. Examples of this additive are: TbCl3, DyCl3, ErCl3, TmCl3, Al(C5H7O2)3, and Er2S3. The polyamic acid solution was imidized and is combined with the article to form the assembly.

NASA



N92-12121*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

A PROCESS FOR PREPARING AN ASSEMBLY OF AN ARTICLE AND A SOLUBLE POLYAMIDE WHICH RESISTS DIMENSIONAL CHANGE, DELAMINATION, AND DEBONDING WHEN EXPOSED TO CHANGES IN TEMPERATURE Patent Application

DIANE M. STOAKLEY, inventor (to NASA) and ANNE K. ST.CLAIR, inventor (to NASA) 26 Jul. 1991 14 p (NASA-CASE-LAR-14763-1; NAS 1.71:LAR-14763-1; US-PATENT-APPL-SN-736667) Avail: NTIS HC/MF A03 CSCL 11C

An assembly of an article and a polyamide is prepared. The assembly resists dimensional change, delamination, or debonding when exposed to changes in temperature. An article is provided. A soluble polyamide resin solution having a low coefficient of thermal expansion (CTE) was prepared by dissolving the polyamide in solvent and adding a metal ion-containing additive to the solution. Examples of the additive are: Ho(OOCCH3), Er(NPPA)3, TmCl3, and Er(C5H7O2)3. The soluble polyamide resin is combined with the article to form the assembly.

NASA

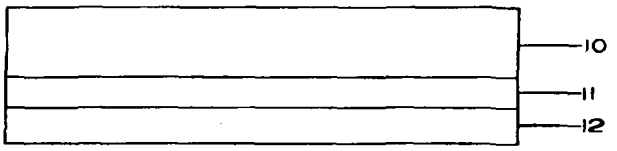


FIGURE 1

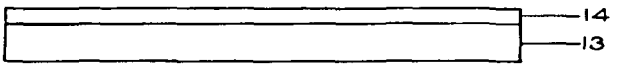
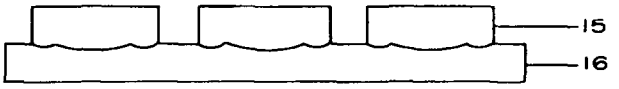


FIGURE 2



N92-16121* National Aeronautics and Space Administration. Pasadena Office, CA.

SILICON CONTAINING ELECTROCONDUCTIVE POLYMERS AND STRUCTURES MADE THEREFROM Patent

GANESAN NAGASUBRAMANIAN, inventor (to NASA), SALVADOR DISTEFANO, inventor (to NASA), and RANTY H. LIANG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 19 Nov. 1991 12 p Filed 7 Feb. 1990 Supersedes N90-26952 (28 - 21, p 2983) (NASA-CASE-NPO-17826-1-CU; US-PATENT-5,066,748; US-PATENT-APPL-SN-479485; US-PATENT-CLASS-526-258; US-PATENT-CLASS-252-500; US-PATENT-CLASS-252-518; US-PATENT-CLASS-528-22; INT-PATENT-CLASS-H01B-1/00)

Avail: US Patent and Trademark Office CSCL 11C

An electropolymerized film comprised of polymers and copolymers of a monomer is formed on the surface of an anode. The finished structures have superior electrical and mechanical properties for use in applications such as electrostatic dissipation

and for the reduction of the radar cross section of advanced aircraft.

Official Gazette of the U.S. Patent and Trademark Office

N92-16122* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

METHOD OF MAKING CONTAMINATION-FREE CERAMIC BODIES Patent

WARREN H. PHILIPP, inventor (to NASA) 19 Nov. 1991 5 p Filed 9 Nov. 1990 Supersedes N91-16152 (29 - 8, p 1120) (NASA-CASE-LEW-14984-1; US-PATENT-5,066,625; US-PATENT-APPL-SN-610883; US-PATENT-CLASS-501-127; US-PATENT-CLASS-501-123; US-PATENT-CLASS-423-630; US-PATENT-CLASS-264-63; INT-PATENT-CLASS-C04B-35/10) Avail: US Patent and Trademark Office CSCL 11C

Ceramic structures having high strength at temperatures above 1000 C after sintering are made by mixing ceramic powders with binder deflocculants such as guanidine salts of polymeric acids, guanidine salts of aliphatic organic carboxylic acids or guanidine alkylsulfates with the foregoing guanidine salts. The novelty of the invention appears to lie in the substitution of guanidine salts for the alkalai metal salt components or organic fatty acids of the prior art binder-deflocculant, ceramic processing aids whereby no undesirable metal contaminants are present in the final ceramic structure. Guanidine alkylsulfates also replace the Na or K alkylsulfates commonly used with binder-deflocculants in making high temperature ceramic structures.

Official Gazette of the U.S. Patent and Trademark Office

N92-16123* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

SPRAYABLE LIGHTWEIGHT ABLATIVE COATING Patent

WILLIAM G. SIMPSON, inventor (to NASA), MAX H. SHARPE, inventor (to NASA), and WILLIAM E. HILL, inventor (to NASA) 12 Nov. 1991 4 p Filed 28 Nov. 1990 Supersedes N91-24426 (29 - 16, p 2604) (NASA-CASE-MFS-28372-1; US-PATENT-5,064,868; US-PATENT-APPL-SN-618854; US-PATENT-CLASS-521-54; US-PATENT-CLASS-521-135; US-PATENT-CLASS-521-136; US-PATENT-CLASS-521-178; US-PATENT-CLASS-521-907; US-PATENT-CLASS-521-84.1; US-PATENT-CLASS-521-109.1) Avail: Issuing Activity CSCL 11C

An improved lightweight, ablative coating is disclosed that may be spray applied and cured without the development of appreciable shrinkage cracks. The ablative mixture consists essentially of phenolic microballoons, hollow glass spheres, glass fibers, ground cork, a flexibilized resin binder, and an activated colloidal clay.

Official Gazette of the U.S. Patent and Trademark Office

N92-17676*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

POLYIMIDES CONTAINING AMIDE AND PERFLUOROISOPROPYL CONNECTING GROUPS Patent Application

JAMES F. DEZERN, inventor (to NASA) 28 Aug. 1991 14 p (NASA-CASE-LAR-14608-1; NAS 1.71:LAR-14608-1; US-PATENT-APPL-SN-752246) Avail: NTIS HC/MF A03 CSCL 11B

New, thermooxidatively stable polyimides were prepared from the reaction of aromatic dianhydrides containing isopropylidene bridging groups with aromatic diamines containing amide connecting groups between the rings. Several of these polyimides were shown to be semi-crystalline as evidenced by wide angle x ray scattering and differential scanning calorimetry. Most of the polyimides form tough, flexible films with high tensile properties. These polyamide films exhibit enhanced solubility in organic solvents.

NASA

N92-21711* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SEMI-INTERPENETRATING POLYMER NETWORK FOR TOUGHER AND MORE MICROCRACKING RESISTANT HIGH TEMPERATURE POLYMERS Patent

RUTH H. PATER, inventor (to NASA) 24 Mar. 1992 13 p Filed 26 Jan. 1989 Supersedes N89-25334 (27 - 19, p 2698) (NASA-CASE-LAR-13925-1; US-PATENT-5,098,961; US-PATENT-APPL-SN-301925; US-PATENT-CLASS-525-422; US-PATENT-CLASS-524-495; US-PATENT-CLASS-525-432; US-PATENT-CLASS-525-903; INT-PATENT-CLASS-C08L-79/08; INT-PATENT-CLASS-C08J-5/08; INT-PATENT-CLASS-C08K-3/04) Avail: US Patent and Trademark Office CSCL 11C

This invention is a semi-interpenetrating polymer network which includes a high performance thermosetting polyamide having a nadic end group acting as a crosslinking site and a high performance linear thermoplastic polyamide. An improved high temperature matrix resin is provided which is capable of performing at 316 C in air for several hundreds of hours. This resin has significantly improved toughness and microcracking resistance, excellent processability and mechanical performance, and cost effectiveness.

Official Gazette of the U.S. Patent and Trademark Office

N92-22044* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

TOUGH, HIGH PERFORMANCE, ADDITION-TYPE THERMOPLASTIC POLYMERS Patent

RUTH H. PATER, inventor (to NASA) 14 Jan. 1992 22 p Filed 13 Nov. 1989 Continuation-in-part of abandoned US-Patent-Appl-SN-250480, filed 28 Sep. 1988 (NASA-CASE-LAR-14346-1; US-PATENT-5,081,198; US-PATENT-APPL-SN-434195; US-PATENT-APPL-SN-250480; US-PATENT-CLASS-526-262; US-PATENT-CLASS-526-248; US-PATENT-CLASS-526-249; US-PATENT-CLASS-525-275; US-PATENT-CLASS-525-421; US-PATENT-CLASS-525-422) Avail: US Patent and Trademark Office CSCL 11C

A tough, high performance polyamide is provided by reacting a triple bond conjugated with an aromatic ring in a bisethynyl compound with the active double bond in a compound containing a double bond activated toward the formation of a Diels-Adler type adduct, especially a bismaleimide, a biscitraconimide, or a benzoquinone, or mixtures thereof. Addition curing of this product produces a high linear polymeric structure and heat treating the highly linear polymeric structure produces a thermally stable aromatic addition-type thermoplastic polyamide, which finds utility in the preparation of molding compounds, adhesive compositions, and polymer matrix composites.

Official Gazette of the U.S. Patent and Trademark Office

31

ENGINEERING (GENERAL)

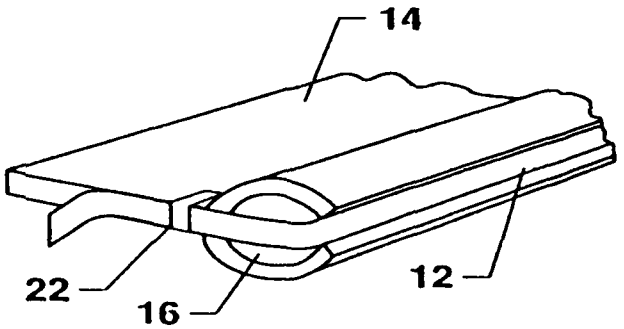
Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

N92-11219*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

INTEGRAL FILL YARN INSERTION AND BEATUP METHOD Patent Application
GARY L. FARLEY, inventor (to NASA) 26 Sep. 1991 14 p
(NASA-CASE-LAR-14046-1; NAS 1.71:LAR-14046-1;
US-PATENT-APPL-SN-766597) Avail: NTIS HC/MF A03 CSCL 13H

An apparatus and method for integral fill yarn insertion and beatup are disclosed. A modified rapier contains a channel for holding fill yarn. The channel is covered with a flexible and inflatable boot, and an inflating apparatus for this boot is also attached. Fill yarn is inserted into the channel, and the rapier is extended into a shed formed by warp yarn. Next, the rapier is pushed into the fell of the fabric, and the flexible and inflatable cover inflated, which both pushes the yarn into the fell of the fabric and performs beatup. The rapier is withdrawn and the shed closed to complete one step of the weaving process.

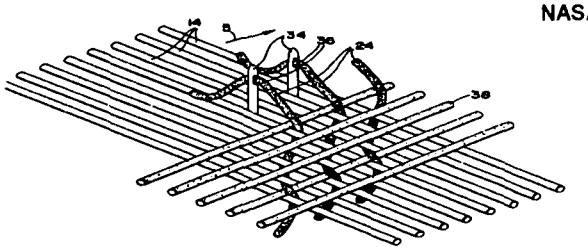
NASA



N92-11220*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
WOVEN ANGLE PLY FABRIC AND APPARATUS AND METHOD FOR PRODUCING SUCH FABRICS Patent Application
GARY L. FARLEY, inventor (to NASA) 26 Sep. 1991 20 p
(NASA-CASE-LAR-14048-1; NAS 1.71:LAR-14048-1;
US-PATENT-APPL-SN-766609) Avail: NTIS HC/MF A03 CSCL 13H

Planar or multilayer structural preforms are made having yarns extending in a bias direction of the preform. Angularly directed yarns can be inserted in planar and multilayer fabrics to increase shear strength of structural preforms made from the fabrics. In multilayer fabrics, the angle yarns can extend between layers to provide through-the-thickness reinforcement. Fabrics are formed by carrying yarns transversely across the fabric as the fabric advances. Fill yarns may be inserted by an insertion technique employing a pneumatic beating element. Angle yarn feeding arrangements are made readily removable to provide for the use of other weaving assemblies.

NASA



N92-15203* National Aeronautics and Space Administration. Pasadena Office, CA.
MULTICOMPONENT GAS SORPTION JOULE-THOMSON REFRIGERATION Patent
JACK A. JONES, inventor (to NASA), S. WALTER PETRICK, inventor (to NASA), and STEVEN BARD, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Nov. 1991 7 p Filed 28 Jun. 1990 Supersedes N90-26176 (28 - 20, p 2844)
(NASA-CASE-NPO-17569-1-CU; US-PATENT-5,063,747;
US-PATENT-APPL-SN-545236; US-PATENT-CLASS-62-461;
US-PATENT-CLASS-624-3.2; US-PATENT-CLASS-624-51.2;
US-PATENT-CLASS-624-467; US-PATENT-CLASS-624-500;
INT-PATENT-CLASS-F17C-11/00) Avail: US Patent and Trademark Office CSCL 13I

The present invention relate stoacryogenic JouleThomson refrigeration capable of pumping multicomponent gases with a single stage sorption compressor system. Alternative methods of pumping a multicomponent gas with a single stage compressor are disclosed. In a first embodiment, the sorbent geometry is such that a void is defined near the output of the sorption compressor. When the sorbent is cooled, the sorbent primarily adsorbs the higher boiling point gas such that the lower boiling point gas passes through the sorbent to occupy the void. When the sorbent is heated, the higher boiling point gas is desorbed at high temperature and pressure and thereafter propels the lower boiling point gas out of the sorption compressor. A mixing chamber is provided to remix the constituent gases prior to expansion of the gas through a JouleThomson valve. Other methods of pumping a multicomponent gas are disclosed. For example, where the sorbent is porous and the low boiling point gas does not adsorb very well, the pores of the sorbent will act as a void space for the lower boiling point gas. Alternatively, a mixed sorbent may be used where a first sorbent component physically adsorbs the high boiling point gas and where the second sorbent component chemically absorbs the low boiling point gas.

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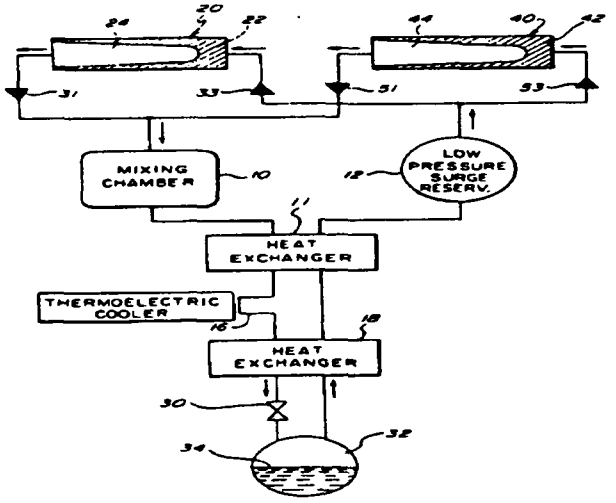
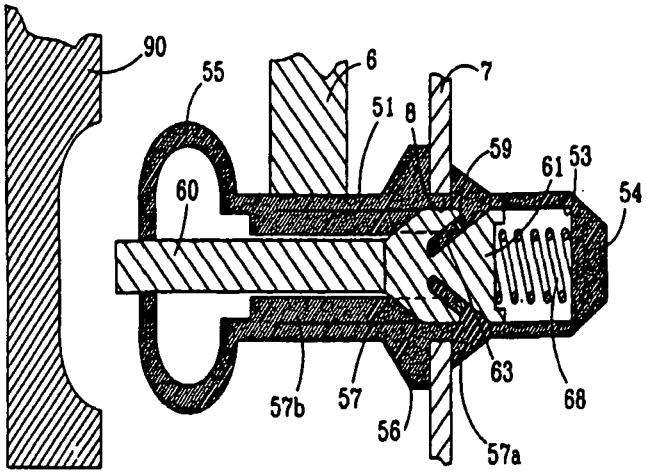


N92-16161* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
METHOD AND APPARATUS FOR RELEASABLY CONNECTING FIRST AND SECOND OBJECTS Patent
LEO G. MONFORD, JR., inventor (to NASA) 29 Oct. 1991
9 p Filed 13 Feb. 1991 Supersedes N91-24577 (29 - 16, p 2633)
(NASA-CASE-MSC-21517-1; US-PATENT-5,061,112;
US-PATENT-APPL-SN-654704; US-PATENT-CLASS-403-328;
US-PATENT-CLASS-411-348; US-PATENT-CLASS-292-251.5;

US-PATENT-CLASS-403-DIG.1; INT-PATENT-CLASS-B25G-3/18)
Avail: US Patent and Trademark Office CSCL 13I

The apparatus and method are disclosed for releasably connecting first and second objects, where a magnetic end effector may include at least one elongated pin number, a proximal end of which is connected to the first object and the distal end of which may be inserted into a receiving portion in the second object. Latch members are carried by the pin member for radial movement between retracted and expanded positions for releasing and locking, respectively, first and second objects. A plunger member carried by the pin member is axially moveable between first and second positions. In the first plunger position, the latch members are located in the expanded (locked) position and in the second plunger position the latch members are released for movement to retracted or unlocked position. The magnetic end effector is provided for releasable attachment to the first object and for moving the plunger member to the second position, releasing the first object.

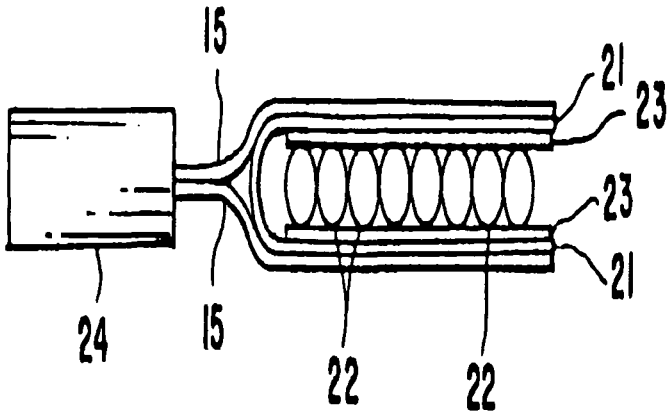
Official Gazette of the U.S. Patent and Trademark Office



N92-16162* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
PERMANENT WIRE SPLICING BY AN EXPLOSIVE JOINING PROCESS Patent
LAURENCE J. BEMENT, inventor (to NASA) and ANNE C. KUSHNICK, inventor (to NASA) 12 Nov. 1991 7 p Filed 2 Oct. 1990
(NASA-CASE-LAR-13825-1; US-PATENT-5,064,111; US-PATENT-APPL-SN-591645; US-PATENT-CLASS-228-107; US-PATENT-CLASS-228-2.5; INNT-PATENT-CLASS-B23K-20/08)
Avail: US Patent and Trademark Office CSCL 13H

The invention is an apparatus and method for wire splicing using an explosive joining process. The apparatus consists of a prebent, U-shaped strap of metal that slides over prepositioned wires. A standoff means separates the wires from the strap before joining. An adhesive means holds two ribbon explosives in position centered over the U-shaped strap. A detonating means connects to the ribbon explosives. The process involves spreading strands of each wire to be joined into a flat plane. The process then requires alternating each strand in alignment to form a mesh-like arrangement with an overlapped area. The strap slides over the strands of the wires, and the standoff means is positioned between the two surfaces. The detonating means then initiates the ribbon explosives that drive the strap to accomplish a high velocity, angular collision between the mating surfaces. This collision creates surface melts and collision bonding results in electron sharing linkups.

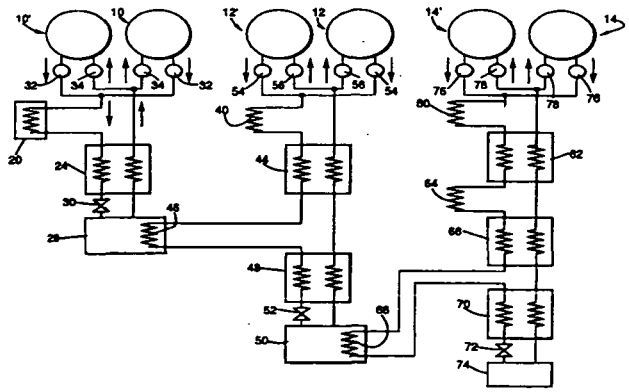
Official Gazette of the U.S. Patent and Trademark Office



N92-17674*# National Aeronautics and Space Administration. Pasadena Office, CA.
THREE-STAGE SORPTION TYPE CRYOGENIC REFRIGERATION SYSTEM AND METHOD EMPLOYING HEAT REGENERATION Patent Application
STEVEN BARD, inventor (to NASA) and JACK A. JONES, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 Oct. 1991 21 p
(Contract NAS7-918)
(NASA-CASE-NPO-18366-1-CU; NAS 1.71:NPO-18366-1-CU; US-PATENT-APPL-SN-781520) Avail: NTIS HC/MF A03 CSCL 13B

A three-stage sorption type cryogenic refrigeration system, each stage containing a fluid having a respectively different boiling point. Each stage includes a compressor in which a respective fluid is heated to be placed in a high pressure gaseous state. The compressor for that fluid which is heated to the highest temperature is enclosed by the other two compressors to permit heat to be transferred from the inner compressor to the surrounding compressors. The system may include two sets of compressors, each having the structure described above, with the interior compressors of the two sets coupled together to permit selective heat transfer therebetween, resulting in more efficient utilization of input power.

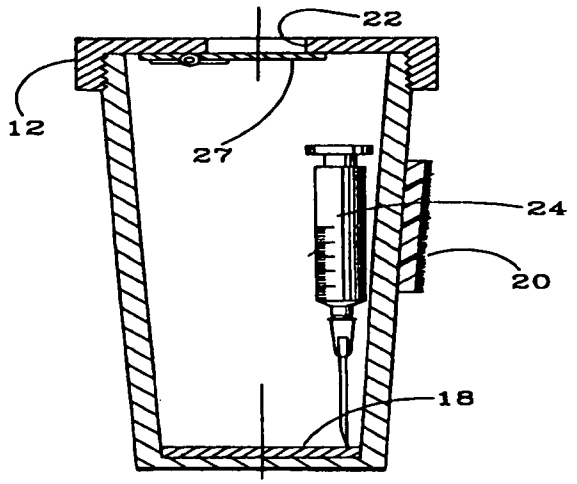
NASA



N92-17913*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
SHARPS CONTAINER Patent Application
ANGELENE M. LEE, inventor (to NASA) 7 Oct. 1991 13 p
(NASA-CASE-MSC-21776-1; NAS 1.71:MSC-21776-1; US-PATENT-APPL-SN-772763) Avail: NTIS HC/MF A03 CSCL 13B

This invention relates to a system for use in disposing of potentially hazardous items and more particularly a Sharps receptacle for used hypodermic needles and the like. A Sharps container is constructed from lightweight alodined nonmagnetic metal material with a cup member having an elongated tapered shape and length greater than its transverse dimensions. A magnet in the cup member provides for metal retention in the container. A nonmagnetic lid member has an opening and spring biased closure flap member. The flap member is constructed from stainless steel. A Velcro patch on the container permits selective attachment at desired locations.

NASA



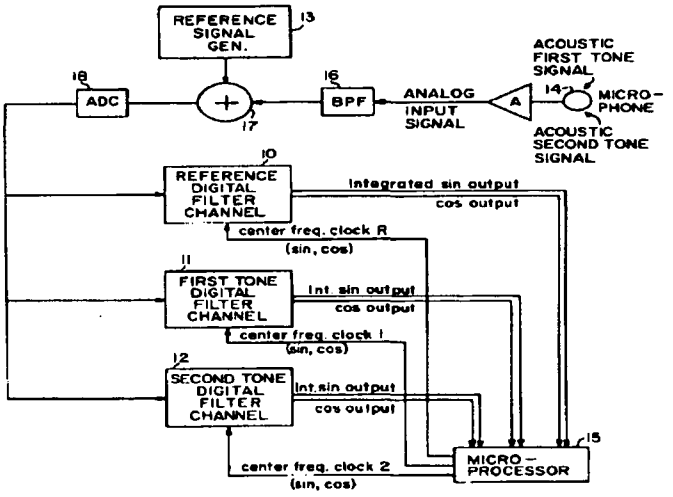
32
COMMUNICATIONS AND RADAR

Includes radar; land and global communications; communications theory; and optical communications.

N92-10125*# National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD AND APPARATUS FOR FREQUENCY SPECTRUM ANALYSIS Patent Application
STEVEN W. COLE, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 25 Feb. 1991 22 p
(Contract NAS7-918)
(NASA-CASE-NPO-17759-1-CU; NAS 1.71:NPO-17759-1-CU; US-PATENT-APPL-SN-660371) Avail: NTIS HC/MF A03 CSCL 17B

The invention relates to a method and apparatus for frequency spectrum analysis of an unknown signal in real time based upon integration of 1-bit samples of signal voltage amplitude corresponding to sine or cosine phases of a controlled center frequency clock which is changed after each integration interval to sweep the frequency range of interest in steps. Integration of samples during each interval is carried out over a number of cycles of the center frequency clock spanning a number of cycles of an input signal to be analyzed. The invention may be used to detect the frequency of at least two signals simultaneously. By using a reference signal of known frequency and voltage amplitude (added to the two signals for parallel processing in the same way, but in a different channel with a sampling at the known frequency and phases of the reference signal), the absolute voltage amplitude of the other two signals may be determined by squaring the sine and cosine integrals of each channel and summing the squares to obtain relative power measurements in all three channels and, from the known voltage amplitude of the reference signal, obtaining an absolute voltage measurement for the other two signals by multiplying the known voltage of the reference signal with the ratio of the relative power of each of the other two signals to the relative power of the reference signal.

NASA

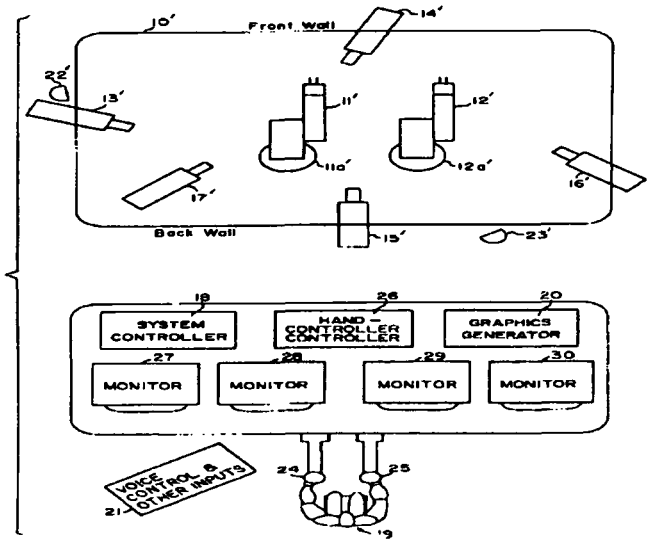


N92-10126*# National Aeronautics and Space Administration. Pasadena Office, CA.
COMPOSITE VIDEO AND GRAPHICS DISPLAY FOR MULTIPLE CAMERA VIEWING SYSTEM IN ROBOTICS AND TELEOPERATION Patent Application
DANIEL B. DINER, inventor (to NASA) and STEVEN C. VENEMA, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 17 Jun. 1991 24 p
(Contract NAS7-918)
(NASA-CASE-NPO-17836-1-CU; NAS 1.71:NPO-17836-1-CU; US-PATENT-APPL-SN-716150) Avail: NTIS HC/MF A03 CSCL 17B

A system for real-time video image display for robotics or remote-vehicle teleoperation is described that has at least one robot arm or remotely operated vehicle controlled by an operator through hand-controllers, and one or more television cameras and optional lighting element. The system has at least one television monitor for display of a television image from a selected camera and the ability to select one of the cameras for image display. Graphics are generated with icons of cameras and lighting elements for display surrounding the television image to provide the operator information on: the location and orientation of each camera and lighting element; the region of illumination of each lighting element; the viewed region and range of focus of each camera; which

camera is currently selected for image display for each monitor; and when the controller coordinate for said robot arms or remotely operated vehicles have been transformed to correspond to coordinates of a selected or nonselected camera.

NASA



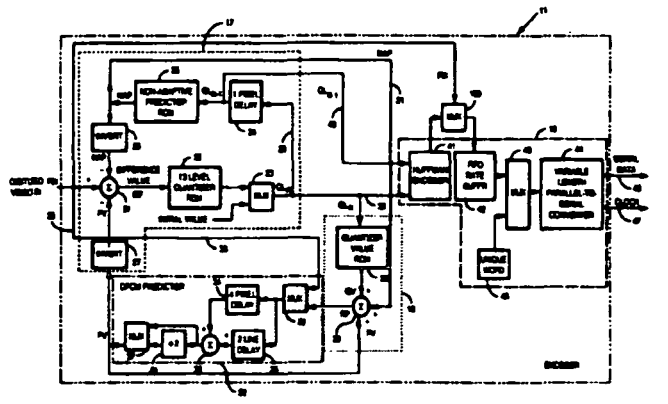
N92-10128* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

REAL-TIME DATA COMPRESSION OF BROADCAST VIDEO SIGNALS Patent

MARY JO W. SHALKAUSER, inventor (to NASA), WAYNE A. WHYTE, JR., inventor (to NASA), and SCOTT P. BARNES, inventor (to NASA) 15 Oct. 1991 30 p Filed 9 Nov. 1990 Supersedes N91-15469 (29 - 7, p 996) Continuation-in-part of US-Patent-Appl-SN-540976, filed 20 Jun. 1990 (NASA-CASE-LEW-14945-2; US-PATENT-5,057,917; US-PATENT-APPL-SN-611214; US-PATENT-APPL-SN-540976; US-PATENT-CLASS-358-135; US-PATENT-CLASS-358-133; INT-PATENT-CLASS-H04N-7/13) Avail: US Patent and Trademark Office CSCL 17B

A non-adaptive predictor, a nonuniform quantizer, and a multi-level Huffman coder are incorporated into a differential pulse code modulation system for coding and decoding broadcast video signals in real time.

Official Gazette of the U.S. Patent and Trademark Office



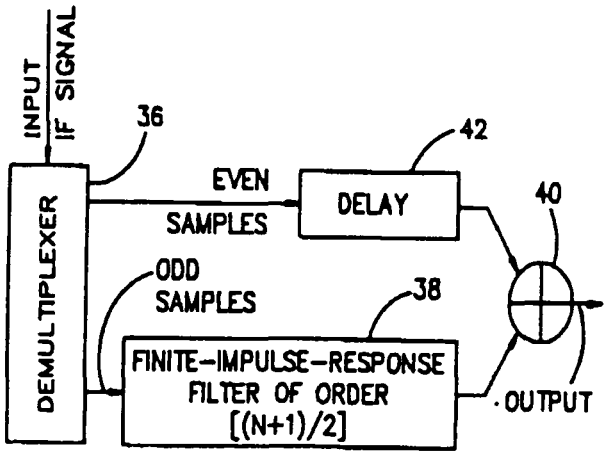
N92-21712* National Aeronautics and Space Administration. Pasadena Office, CA.

DIGITAL CARRIER DEMODULATOR EMPLOYING COMPONENTS WORKING BEYOND NORMAL LIMITS Patent

WILLIAM J. HURD, inventor (to NASA) and RAMIN SADR, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 7 Aug. 1990 6 p Filed 12 May 1989 Supersedes N89-28684 (27 - 23, p 3276) (NASA-CASE-NPO-17628-1-CU; US-PATENT-4,947,408; US-PATENT-APPL-SN-350813; US-PATENT-CLASS-375-94; US-PATENT-CLASS-375-80; US-PATENT-CLASS-329-310; INT-PATENT-CLASS-H03D-1/06) Avail: US Patent and Trademark Office CSCL 20N

In a digital device, having an input comprised of a digital sample stream at a frequency F, a method is disclosed for employing a component designed to work at a frequency less than F. The method, in general, is comprised of the following steps: dividing the digital sample stream into odd and even digital samples streams each at a frequency of F/2; passing one of the digital sample streams through the component designed to work at a frequency less than F where the component responds only to the odd or even digital samples in one of the digital sample streams; delaying the other digital sample streams for the time it takes the digital sample stream to pass through the component; and adding the one digital sample stream after passing through the component with the other delayed digital sample streams. In the specific example, the component is a finite impulse response filter of the order ((N + 1)/2) and the delaying step comprised passing the other digital sample streams through a shift register for a time (in sampling periods) of ((N + 1)/2) + r, where r is a pipline delay through the finite impulse response filter.

Official Gazette of the U.S. Patent and Trademark Office



N92-22033* National Aeronautics and Space Administration. Pasadena Office, CA.

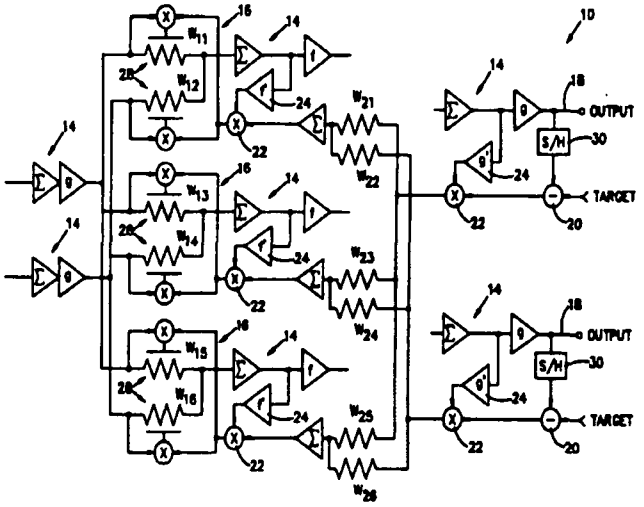
ANALOG HARDWARE FOR DELTA-BACKPROPAGATION NEURAL NETWORKS Patent

SILVIO P. EBERHARDT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Mar. 1992 10 p Filed 29 Sep. 1989 Supersedes N90-16974 (28 - 9, p 1204) (NASA-CASE-NPO-17564-1-CU; US-PATENT-5,101,361; US-PATENT-APPL-SN-414811; US-PATENT-CLASS-395-24; US-PATENT-CLASS-364-807; US-PATENT-CLASS-307-201; INT-PATENT-CLASS-G06G-7/12) Avail: US Patent and Trademark Office CSCL 09B

This is a fully parallel analog backpropagation learning processor which comprises a plurality of programmable resistive

memory elements serving as synapse connections whose values can be weighted during learning with buffer amplifiers, summing circuits, and sample-and-hold circuits arranged in a plurality of neuron layers in accordance with delta-backpropagation algorithms modified so as to control weight changes due to circuit drift.

Official Gazette of the U.S. Patent and Trademark Office



33
ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

N92-10146*# National Aeronautics and Space Administration. Pasadena Office, CA.

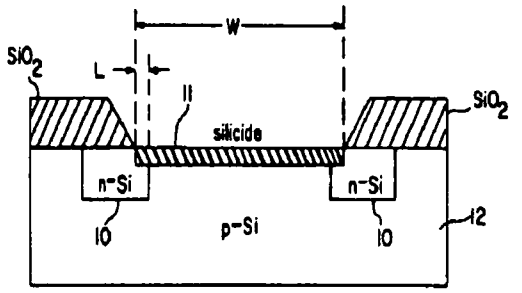
FORMATION OF SELF-ALIGNED GUARD RINGS FOR MONOLITHIC SCHOTTKY-BARRIER DIODE ARRAYS Patent Application

TRUE-LON LIN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 16 May 1991 16 p (Contract NAS7-918)

(NASA-CASE-NPO-17734-1-CU; NAS 1.71:NPO-17734-1-CU; US-PATENT-APPL-SN-700830) Avail: NTIS HC/MF A03 CSCL 09A

A method for fabricating self-aligned n-type guard rings in a body of p-type silicon for a silicide/Schottky-barrier diode array consists of depositing SiO2 with uniformly distributed phosphorus ions as a masking layer on the surface of the p-doped silicon body before etching the masking layer in the desired pattern of guard rings. N-type guard rings buried in the p-type silicon substrate are then formed by heating the structure to diffuse the phosphorus ions remaining on the surface functions as a mask for the remaining steps of the process which are to deposit metal over the entire surface of the structure and then form a silicide in those areas inside the SiO2 grid pattern by heating the structure. Metal not converted to a silicide is then removed by etching. The silicide and p-type silicon form a Schottky-barrier diode at their junction in areas inside the buried guard rings. Overlap of the silicide and the guard rings is minimized by this self-aligning technique to maximize the fill factor of the array.

NASA



N92-12174*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

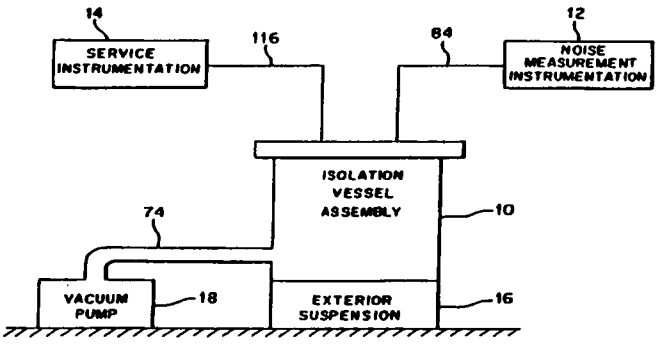
VACUUM-ISOLATION VESSEL AND METHOD FOR MEASUREMENT OF THERMAL NOISE IN MICROPHONES Patent Application

ALLAN J. ZUCKERWAR, inventor (to NASA) and KIM CHI T. NGO, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) 7 Oct. 1991 17 p

(NASA-CASE-LAR-14567-1-CU; NAS 1.71:LAR-14567-1-CU; US-PATENT-APPL-SN-773376) Avail: NTIS HC/MF A03 CSCL 09C

The vacuum isolation vessel and method in accordance with the present invention are used to accurately measure thermal noise in microphones. The apparatus and method could be used in a microphone calibration facility or any facility used for testing microphones. Thermal noise is measured to determine the minimum detectable sound pressure by the microphone. Conventional isolation apparatus and methods have been unable to provide an acoustically quiet and substantially vibration free environment for accurately measuring thermal noise. In the present invention, an isolation vessel assembly comprises a vacuum sealed outer vessel, a vacuum sealed inner vessel, and an interior suspension assembly coupled between the outer and inner vessels for suspending the inner vessel within the outer vessel. A noise measurement system records thermal noise data from the isolation vessel assembly. A vacuum system creates a vacuum between an internal surface of the outer vessel and an external surface of the inner vessel. The present invention thus provides an acoustically quiet environment due to the vacuum created between the inner and outer vessels and a substantially vibration free environment due to the suspension assembly suspending the inner vessel within the outer vessel. The thermal noise in the microphone, effectively isolated according to the invention, can be accurately measured.

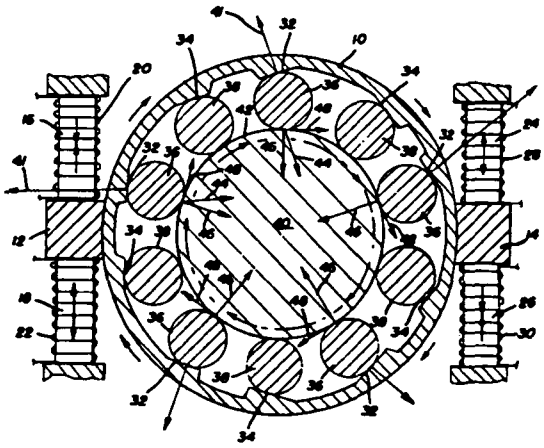
NASA



N92-15331* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
MAGNETOSTRICTIVE ROLLER DRIVE MOTOR Patent
JOHN M. VRANISH, inventor (to NASA) 7 Jan. 1992
10 p Filed 10 Jan. 1991 Supersedes N91-23380 (29 - 15, p 2416)
(NASA-CASE-GSC-13369-1; US-PATENT-5,079,460;
US-PATENT-APPL-SN-645972; US-PATENT-CLASS-310-26;
US-PATENT-CLASS-310-83; US-PATENT-CLASS-310-265;
US-PATENT-CLASS-367-156; INT-PATENT-CLASS-H04R-15/00)
Avail: US Patent and Trademark Office CSCL 09A

A magnetostrictive drive motor is disclosed which has a rotary drive shaft in the form of a drum which is encircled by a plurality of substantially equally spaced roller members in the form of two sets of cones which are in contact with the respective cam surfaces on the inside surface of an outer drive ring. The drive ring is attached to sets of opposing pairs of magnetostrictive rods. Each rod in a pair is mutually positioned end to end within respective energizing coils. When one of the coils in an opposing pair is energized, the energized rod expands while the other rod is caused to contract, causing the drive ring to rock, i.e., rotate slightly in either the clockwise or counterclockwise direction, depending upon which rod in a pair is energized. As the drive ring is activated in repetitive cycles in either direction, one set of drive cones attempts to roll up their respective cam surface but are pinned between the drive shaft drum and the drive ring. As the frictional force preventing sliding builds up, the cones become locked, setting up reaction forces including a tangential component which is imparted to the drive shaft drum to provide a source of motor torque. Simultaneously the other set of cones are disengaged from the drive shaft drum. Upon deactivation of the magnetostrictive rod coils, the force on the drive cones is released, causing the system to return to an initial rest position. By repetitively cycling the energization of the magnetostrictive rods, the drive shaft drum indexes in microradian rotational steps.

Official Gazette of the U.S. Patent and Trademark Office



N92-16196* National Aeronautics and Space Administration. Pasadena Office, CA.
METHOD AND APPARATUS FOR INCREASING RESISTANCE OF BIPOLAR BURIED LAYER INTEGRATED CIRCUIT DEVICES TO SINGLE-EVENT UPSETS Patent
JOHN A. ZOUTENDYK, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Dec. 1991 9 p
Filed 20 Feb. 1991 Continuation of abandoned US-Patent-Appl-SN-311552, filed 16 Feb. 1989
(NASA-CASE-NPO-17573-2-CU; US-PATENT-5,072,133;
US-PATENT-APPL-SN-692801; US-PATENT-APPL-SN-311552;
US-PATENT-CLASS-307-296.2; US-PATENT-CLASS-307-296.7;
US-PATENT-CLASS-307-303; US-PATENT-CLASS-307-311;
US-PATENT-CLASS-307-272.1; US-PATENT-CLASS-357-29)
Avail: US Patent and Trademark Office CSCL 09A

Bipolar transistors fabricated in separate buried layers of an integrated circuit chip are electrically isolated with a built-in potential barrier established by doping the buried layer with a polarity opposite doping in the chip substrate. To increase the resistance of the bipolar transistors to single-event upsets due to ionized particle radiation, the substrate is biased relative to the buried layer with an external bias voltage selected to offset the built-in potential just enough (typically between about +0.1 to +0.2 volt) to prevent an accumulation of charge in the buried-layer-substrate junction.

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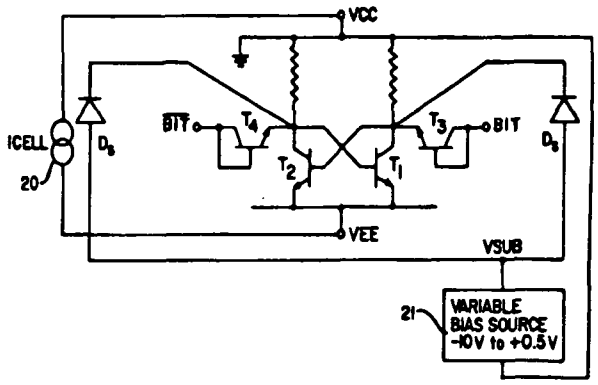
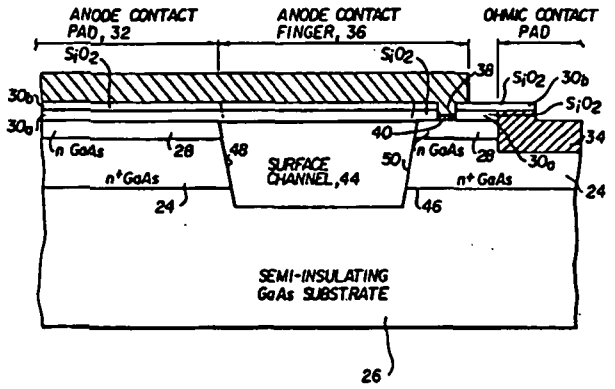


N92-16197* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
WHISKERLESS SCHOTTKY DIODE Patent
WILLIAM L. BISHOP, inventor (to NASA), KATHLEEN A. MCLEOD, inventor (to NASA), and ROBERT J. MATTAUCH, inventor (to NASA) 20 Aug. 1991 11 p Filed 6 Mar. 1989
Continuation-in-part of abandoned US-Patent-Appl-SN-055809, filed18 May 1987
(NASA-CASE-GSC-13063-2-CU; US-PATENT-5,041,881;
US-PATENT-APPL-SN-318981; US-PATENT-APPL-SN-055809;
US-PATENT-CLASS-357-15; US-PATENT-CLASS-357-55;
US-PATENT-CLASS-357-68; US-PATENT-CLASS-357-69;
US-PATENT-CLASS-357-47; INT-PATENT-CLASS-H01L-29/48)
Avail: US Patent and Trademark Office CSCL 09A

A Schottky diode for millimeter and submillimeter wave applications is comprised of a multi-layered structure including active layers of gallium arsenide on a semi-insulating gallium arsenide substrate with first and second insulating layers of silicon dioxide on the active layers of gallium arsenide. An ohmic contact pad lays on the silicon dioxide layers. An anode is formed in a window which is in and through the silicon dioxide layers. An elongated contact finger extends from the pad to the anode and a trench, preferably a transverse channel or trench of predetermined width, is formed in the active layers of the diode structure under the contact finger. The channel extends through the active layers to or substantially to the interface of the semi-insulating gallium arsenide substrate and the adjacent gallium arsenide layer which constitutes a buffer layer. Such a structure minimizes the effect of the major source of shunt capacitance by interrupting the current path between the conductive layers beneath the anode contact pad and the ohmic contact. Other embodiments of the diode may substitute various insulating or semi-insulating materials for the silicon dioxide, various semi-conductors for the active layers of gallium arsenide, and other materials for the

substrate, which may be insulating or semi-insulating.
Official Gazette of the U.S. Patent and Trademark Office



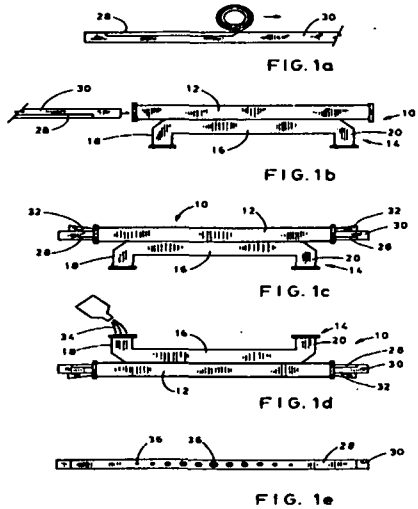
N92-17865*# National Aeronautics and Space Administration. Pasadena Office, CA.

METHOD FOR NON-DESTRUCTIVE ESTIMATION OF WAVEGUIDE DIRECTIONAL COUPLER DIMENSIONS Patent Application

RAUL M. PEREZ, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 Oct. 1991 13 p (Contract NAS7-918)
(NASA-CASE-NPO-18454-1-CU; NAS 1.71:NPO-18454-1-CU; US-PATENT-APPL-SN-781521) Avail: NTIS HC/MF A03 CSCL 09A

A method for estimating the size and location of couplings within a waveguide directional coupler is provided. The method is applied to a waveguide directional coupler having a main transmission waveguide connected to an auxiliary transmission waveguide by a number of bore hold couplings. The bore hold couplings are in the interior of the waveguide directional coupler and, therefore, are not easily measurable. The method generally includes the steps of applying a two-sided tape to a member, inserting and securing the member within the main transmission waveguide, pouring a fine particulate substance such as talc into the auxiliary transmission waveguide such that a portion of the talc enters the bore hole couplings and adheres to the two-sided tape, and withdrawing the member such that the size and location of the bore hole couplings can be determined by measuring the size and location of marks on the two-sided tape caused by the fine particular substance adhering to the two-sided tape.

NASA



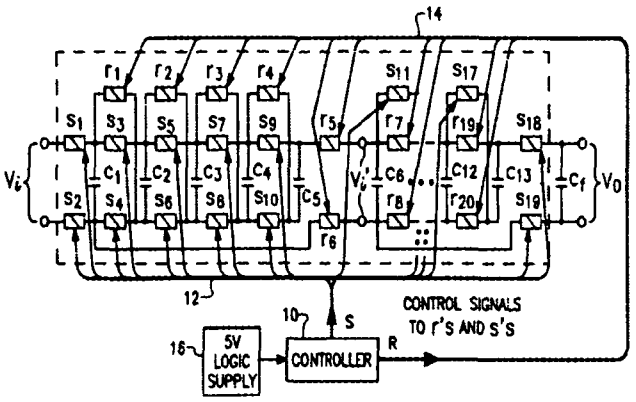
N92-17907*# National Aeronautics and Space Administration. Pasadena Office, CA.

TRANSFORMERLESS DC-DC VOLTAGE AMPLIFIER WITH OPTICALLY ISOLATED SWITCHING DEVICES Patent Application

GOVIND SRIDHARAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 Oct. 1991 13 p (Contract NAS7-918)
(NASA-CASE-NPO-17994-1-CU; NAS 1.71:NPO-17994-1-CU; US-PATENT-APPL-SN-791759) Avail: NTIS HC/MF A03 CSCL 09A

A very high voltage amplifier is provided in which plural cascaded banks of capacitors are switched by optically isolated control switches so as to be charged in parallel from the preceding stage or capacitor bank and to discharge in series to the succeeding stage or capacitor bank in alternating control cycles. The optically isolated control switches are controlled by a logic controller whose power supply is virtually immune to interference from the very high voltage output of the amplifier by the optical isolation provided by the switches, so that a very high voltage amplification ratio may be attained using many capacitor banks in cascade.

NASA



N92-22042* National Aeronautics and Space Administration. Pasadena Office, CA.

ELECTROREPULSIVE ACTUATOR Patent

EARL R. COLLINS, JR., inventor (to NASA) and KENNETH C. CURRY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Jan. 1992 8 p Filed 30 Nov. 1989 (NASA-CASE-NPO-17684-1-CU; US-PATENT-5,084,645; US-PATENT-APPL-SN-443522; US-PATENT-CLASS-310-309; US-PATENT-CLASS-310-308; INT-PATENT-CLASS-H02N-1/08) Avail: US Patent and Trademark Office CSCL 09A

The invention is a linear actuator that operates under the principle that like charges repel and opposite charges attract. The linear actuator consists of first and second pairs of spaced opposed conductors where one member of each pair of conductors is attached to a fixed member, and where the other member of each pair of conductors is attached to a movable member such as an elongated rod. The two pairs of spaced conductors may be provided in the form of two spacedly interwound helical vanes where the conductors are located on the opposite sides of the two helical vanes. One helical vane extends inwardly from a housing and the other helical vane extends outwardly from an elongated rod. The elongated rod may be caused to move linearly with respect

to the housing by applying appropriate charges of like or opposite polarity to the electrical conductors on the helical vanes.

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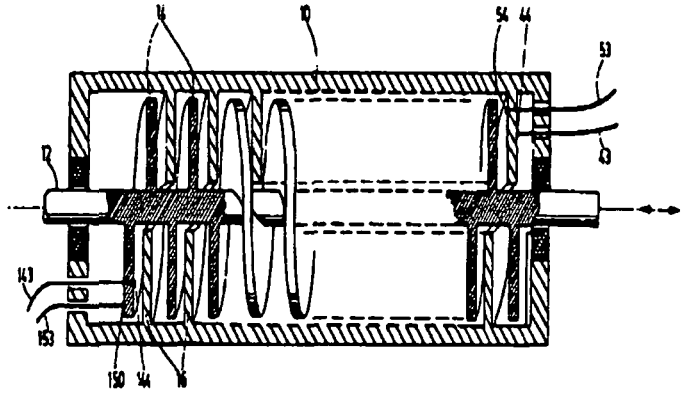


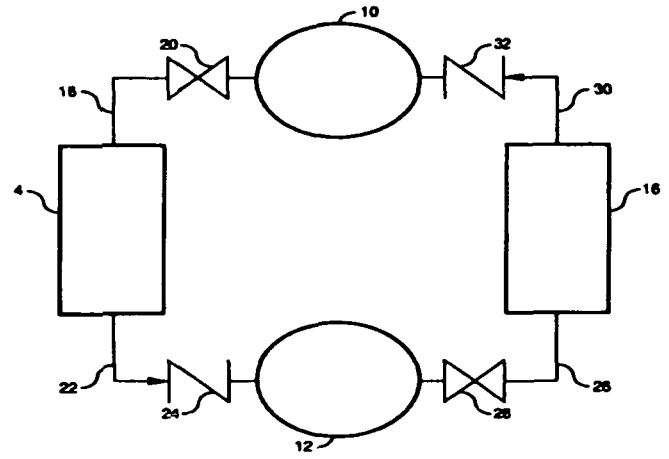
34
FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

N92-10167*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
PULSE THERMAL ENERGY TRANSPORT SYSTEM Patent Application
MARK W. WEISLOGEL, inventor (to NASA) 26 Jul. 1991 15 p
(NASA-CASE-LEW-15235-1; NAS 1.71:LEW-15235-1;
US-PATENT-APPL-SN-736145) Avail: NTIS HC/MF A03 CSCL 20D

A pulse-thermal pump having a novel fluid flow wherein heat admitted to a closed system raises the pressure in a closed evaporator chamber, while another interconnected evaporator chamber remains open, is described. This creates a pressure differential, and at a predetermined pressure, the closed evaporator is opened and the opened evaporator is closed. The difference in pressure initiates fluid flow in the system.

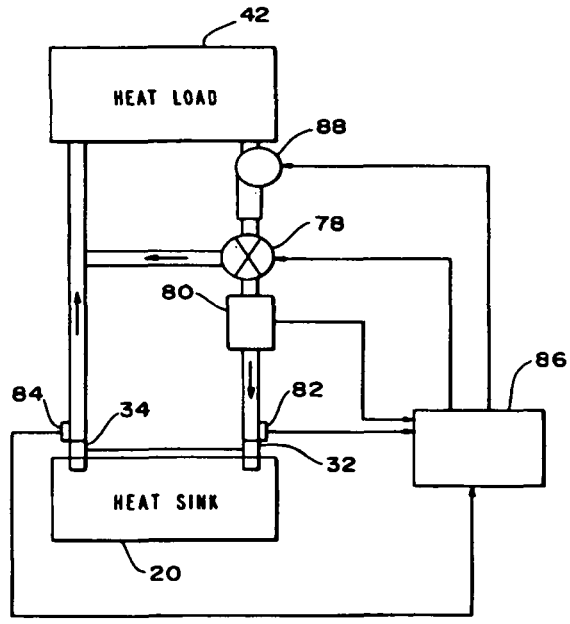
NASA



N92-11286*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
COOLING APPARATUS AND COUPLINGS THEREFOR Patent Application
CURTIS LOMAX, inventor (to NASA) and BRUCE WEBBON, inventor (to NASA) 21 May 1989 25 p
(NASA-CASE-ARC-11921-1; NAS 1.71:ARC-11921-1;
US-PATENT-APPL-SN-703649) Avail: NTIS HC/MF A03 CSCL 20D

The present invention relates generally to the field of thermal transfer and, more specifically, to a direct-interface, fusible heat sink for non-venting, regenerable, and self-contained thermal regulation. A quick connect coupling includes a male and a female portion. The female portion is frozen in a container of solid-phase coolant fluid, i.e., water, so that passages in the housing are blocked by ice initially. The ice is melted by direct interface with liquid coolant fluid delivered from the male portion. The present invention has advantages in that the phase change material remains sealed at all times, including during regeneration. Also, it uses quick-disconnect couplings that allow the phase change material to completely fill the container and is easily handled in microgravity without spills, leakage or handling of phase change material.

NASA



N92-16241* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
HIGH VELOCITY GAS PARTICULATE SAMPLING SYSTEM Patent
WALLACE C. TUTHILL, inventor (to NASA) 12 Nov. 1991
6 p Filed 11 Dec. 1990 Supersedes N91-17340 (29 - 9, p 1336)
(NASA-CASE-MSC-21729-1; US-PATENT-5,063,789;
US-PATENT-APPL-SN-625344; US-PATENT-CLASS-73-863.23;
INT-PATENT-CLASS-G01N-1/00) Avail: US Patent and Trademark Office CSCL 20D

A gas sampling system is disclosed for determining particulate matter contamination in a high velocity gas flow where the sampling chamber is first cleaned, then evacuated and is coupled by a closed three way valve in a straight line relationship to the gas supply line. A predetermined gas flow rate is established through the three way valve which is quickly opened to couple

the dynamically flowing gas to the evacuated sample chamber in a straight line relationship to trap a gas sample under dynamic conditions. When the sampling chamber has a gas sample, the three way valve is again closed so that particulate matter in the sample chamber can be flushed from the sample chamber with a compatible liquid to a filter for collection and analysis.

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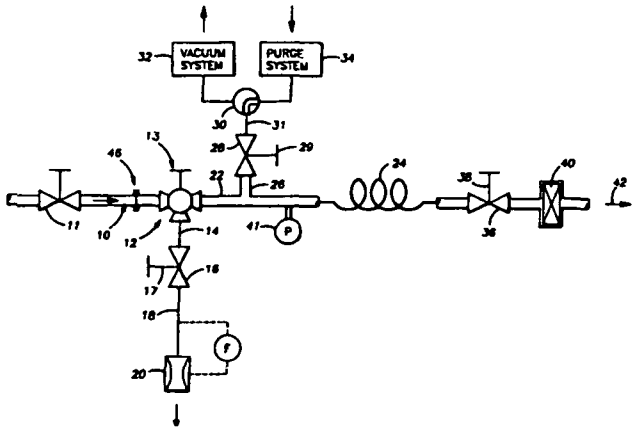

N92-16243* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

ATMOSPHERIC PRESSURE FLOW REACTOR: GAS PHASE CHEMICAL KINETICS UNDER TROPOSPHERIC CONDITIONS WITHOUT WALL EFFECTS Patent

STEVEN L. KOONTZ, inventor (to NASA) and DENNIS D. DAVIS, inventor (to NASA) 31 Dec. 1991 6 p Filed 2 Dec. 1988 (NASA-CASE-MSC-21384-1; US-PATENT-5,077,015; US-PATENT-APPL-SN-279170; US-PATENT-CLASS-422-83; US-PATENT-CLASS-422-93; US-PATENT-CLASS-422-176; INT-PATENT-CLASS-H01N-1/26; INT-PATENT-CLASS-H01N-17/00) Avail: US Patent and Trademark Office CSCL 20D

A flow reactor for simulating the interaction in the troposphere is set forth. A first reactant mixed with a carrier gas is delivered from a pump and flows through a duct having louvers therein. The louvers straighten out the flow, reduce turbulence and provide laminar flow discharge from the duct. A second reactant delivered from a source through a pump is input into the flowing stream, the second reactant being diffused through a plurality of small diffusion tubes to avoid disturbing the laminar flow. The commingled first and second reactants in the carrier gas are then directed along an elongated duct where the walls are spaced away from the flow of reactants to avoid wall interference, disturbance or turbulence arising from the walls. A probe connected with a measuring device can be inserted through various sampling ports in the second duct to complete measurements of the first and second reactants and the product of their reaction at selected XYZ locations relative to the flowing system.

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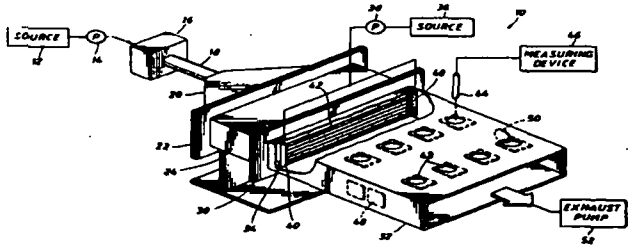


N92-17888*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

ACTIVE CONTROL OF PRESSURE LOADS USING PASSIVE POROSITY Patent Application

RICHARD M. WOOD, inventor (to NASA) and STEVEN X. S. BAUER, inventor (to NASA) 13 Aug. 1991 12 p (NASA-CASE-LAR-14594-1; NAS 1.71:LAR-14594-1; US-PATENT-APPL-SN-748225) Avail: NTIS HC/MF A03 CSCL 20D

A device is provided for controlling pressure loading of a member caused by a fluid moving past the member or the member moving through a fluid. The device consists of two porous skins mounted over the solid surface of the member and separated from the solid surface by a plenum. Fluid from an area exerting high pressure on the member may enter the plenum through the pressure skins and exit into an area exerting a lower pressure on the member, thus controlling pressure loading of the member. The porous inner skin may be translated relative to the porous skin in order to achieve a porosity ranging from zero to the porosity of the porous skins.

NASA

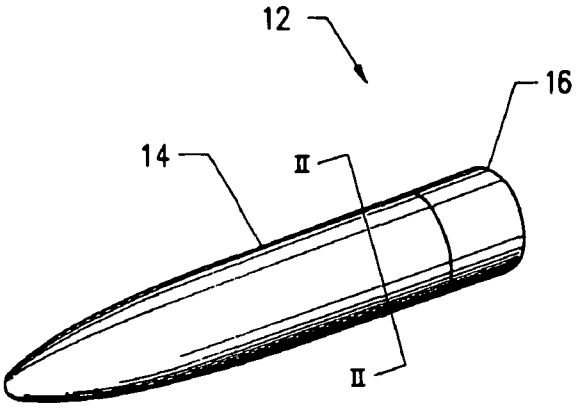
N92-17909*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

PASSIVE CONTROL OF PRESSURE LOADS USING POROSITY Patent Application

RICHARD M. WOOD, inventor (to NASA) and STEVEN X. S. BAUER, inventor (to NASA) 13 Aug. 1991 12 p (NASA-CASE-LAR-14547-1; NAS 1.71:LAR-14547-1; US-PATENT-APPL-SN-748224) Avail: NTIS HC/MF A03 CSCL 20D

A device is provided for controlling pressure loading of a member caused by a fluid moving past the member or the member moving through a fluid. The device consists of a porous skin mounted over the solid surface of the member and separated from the solid surface by a plenum. Fluid from an area exerting high pressure on the member may enter the plenum through the porous surface and exit into an area exerting a lower pressure on the member, thus controlling pressure loading of the member.

NASA



N92-21724* National Aeronautics and Space Administration. Pasadena Office, CA.
ADJUSTABLE STEAM PRODUCING FLEXIBLE ORIFICE INDEPENDENT OF FLUID PRESSURE Patent
ANDREW D. MORRISON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 14 Jan. 1992 7 p Filed 31 May 1990 Supersedes N90-27070 (28 - 21, p 3003) (NASA-CASE-NPO-17625-1-CU; US-PATENT-5,080,286; US-PATENT-APPL-SN-531434; US-PATENT-CLASS-239-533.13; US-PATENT-CLASS-239-543; US-PATENT-CLASS-239-546; US-PATENT-CLASS-239-552; US-PATENT-CLASS-239-602; INT-PATENT-CLASS-B05B-1/02; INT-PATENT-CLASS-B05B-1/14) Avail: US Patent and Trademark Office CSCL 20D

A self-adjusting choke for a fluids nozzle includes a membrane constructed of a single piece of flexible or elastic material. This flexible material is shaped to fit into the outlet of a nozzle. The body of the membrane has at least two flow channels, from one face to the other, which directs two streams of water to cross at the opening of the nozzle or at some point beyond. The elasticity and thickness of the membrane is selected to match the range of expected pressures and fluid velocities. The choke may have more than two flow channels, as long as they are aligned adjacent to one another and directed towards each other at the exit face. In a three orifice embodiment, one is directed upward, one is directed downward, and the one in the middle is directed forward. In this embodiment all three fluid streams intersect at some point past the nozzle opening. Under increased pressure the membrane will deform causing the orifices to realign in a more forward direction, causing the streams to intersect at a smaller angle. This reduces the force with which the separate streams impact each other, still allowing the separate streams to unify into a single stable spiralling stream in spite of the increased pressure.

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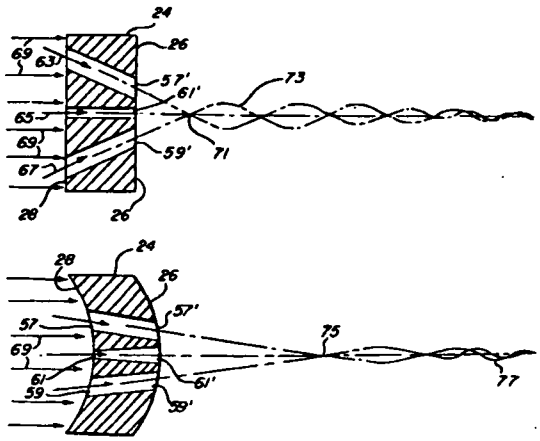


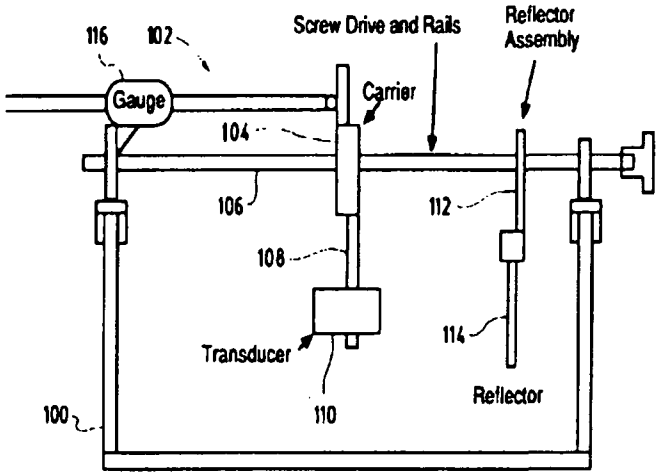
35
INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

N92-10182*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CONSTANT FREQUENCY PULSED PHASE-LOCKED LOOP MEASURING DEVICE Patent Application
WILLIAM T. YOST, inventor (to NASA), PETER W. KUSHNICK, inventor (to NASA) (PRC Kentron, Inc., Hampton, VA.),
and JOHN H. CANTRELL, inventor (to NASA) 26 Aug. 1991 23 p (NASA-CASE-LAR-13823-1; NAS 1.71:LAR-13823-1; US-PATENT-APPL-SN-749737) Avail: NTIS HC/MF A03 CSCL 14B

A measuring apparatus is presented that uses a fixed frequency oscillator to measure small changes in the phase velocity ultrasonic sound when a sample is exposed to environmental changes such as changes in pressure, temperature, etc. The invention automatically balances electrical phase shifts against the acoustical phase shifts in order to obtain an accurate measurement of electrical phase shifts.

NASA



N92-10185* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
DUAL STRAIN GAGE BALANCE SYSTEM FOR MEASURING LIGHT LOADS Patent
PAUL W. ROBERTS, inventor (to NASA) 15 Oct. 1991 9 p Filed 18 Sep. 1990 Supersedes N91-13687 (29 - 5, p 663) (NASA-CASE-LAR-14419-1; US-PATENT-5,056,361; US-PATENT-APPL-SN-584018; US-PATENT-CLASS-73-147; US-PATENT-CLASS-73-862.04; US-PATENT-CLASS-73-862.65; INT-PATENT-CLASS-G01L-5/16; INT-PATENT-CLASS-G01M-9/00)
Avail: US Patent and Trademark Office CSCL 14B

A dual strain gage balance system for measuring normal and axial forces and pitching moment of a metric airfoil model imparted by aerodynamic loads applied to the airfoil model during wind tunnel testing includes a pair of non-metric panels being rigidly connected to and extending towards each other from opposite sides of the wind tunnel, and a pair of strain gage balances, each connected to one of the non-metric panels and to one of the opposite ends of the metric airfoil model for mounting the metric airfoil model between the pair of non-metric panels. Each strain gage balance has a first measuring section for mounting a first strain gage bridge for measuring normal force and pitching

moment and a second measuring section for mounting a second strain gage bridge for measuring axial force.

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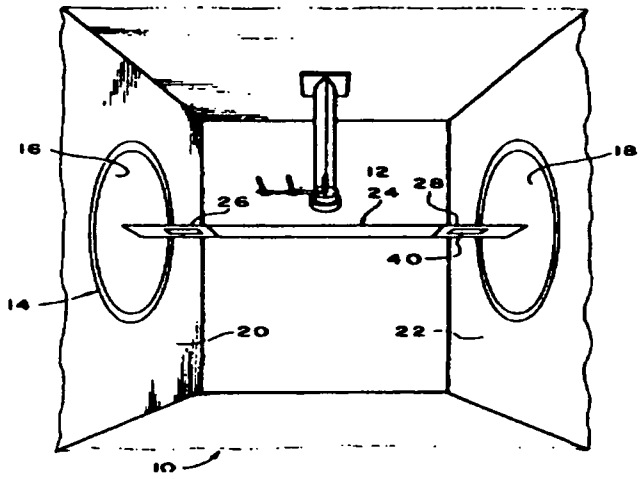

N92-10186* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

CONTROL SYSTEM FOR RULING BLAZED, ABERRATION CORRECTED DIFFRACTION GRATINGS Patent

DOUGLAS B. LEVITON, inventor (to NASA) 22 Oct. 1991 8 p Filed 23 Aug. 1990 Supersedes N91-13692 (29 - 5, p 664) (NASA-CASE-GSC-13240-1; US-PATENT-5,058,281; US-PATENT-APPL-SN-571344; US-PATENT-CLASS-33-19.2; US-PATENT-CLASS-33-23.02; INT-PATENT-CLASS-B43L-13/24) Avail: US Patent and Trademark Office CSCL 14B

The grooved surface of an aberration-corrected holographic model grating is sensed by utilizing the sensing head of a scanning tunneling microscope. The sensing head is mechanically connected to a blazing type stylus for replicating the groove pattern of the holographic model on a ruled grating blank. A ruling engine causes the sensing head not only to scan the surface of the holographic grating model but also drive a blazing type ruling stylus or an equivalent type device in accordance with an error signal resulting from a departure of a sensing tip from the top of the holographic model groove as a function of tunneling current.

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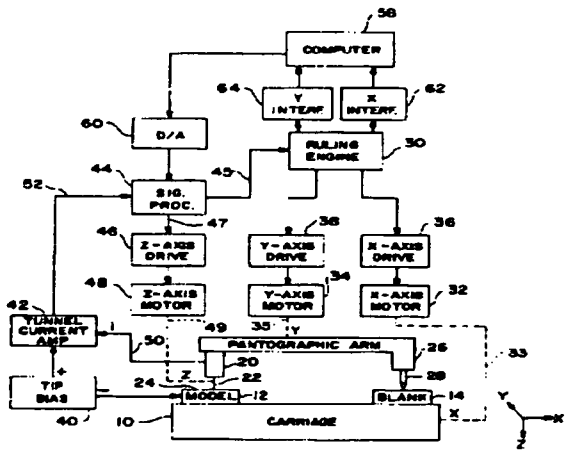


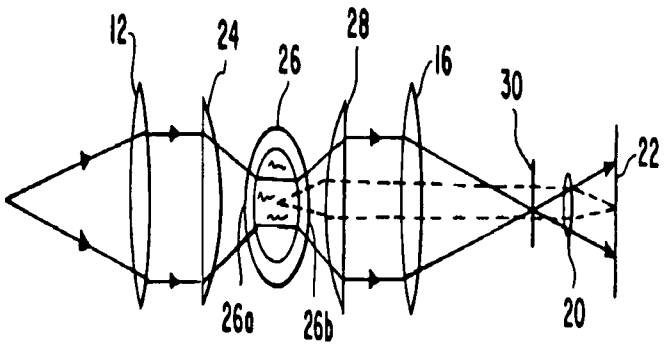
N92-11336*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

SCHLIEREN SYSTEM FOR VISUALIZING THE FLOW WITHIN A PIPE OF CIRCULAR CROSS-SECTION Patent Application

ROBERT C. COSTEN, inventor (to NASA), DAVID B. RHODES, inventor (to NASA), and STEPHEN B. JONES, inventor (to NASA) 15 Aug. 1991 14 p (NASA-CASE-LAR-13944-1; NAS 1.71:LAR-13944-1; US-PATENT-APPL-SN-747152) Avail: NTIS HC/MF A03 CSCL 14B

An on-axis Schlieren system is provided for visualizing the flow within a straight pipe having a circular cross-section. A point source is directed through a collimator to produce a parallel beam of light. A first convergent cylindrical lens converges this exiting beam to a substantially parallel beam which then passes through a reverse collimator and is focused back to a light point. A knife edge is perpendicularly oriented relative to the axis of symmetry of the pipe to block a portion of the light. The unblocked portion of light is then focused and projected into a viewing sensor or film for visualization. The two convergent cylindrical lenses may be replaced by either a single double strength convergent cylindrical lens located between the collimator and the test cell or a single double strength convergent cylindrical lens located between the test cell and the reverse collimator.

NASA



N92-21586* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

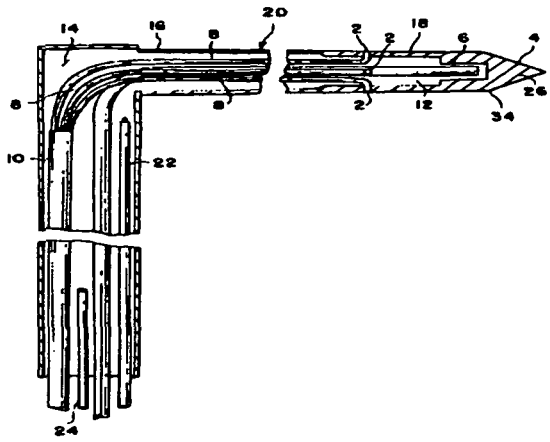
WATER COOLED STATIC PRESSURE PROBE Patent

NICHOLAS T. LAGEN, inventor (to NASA), JOHN W. EVES, inventor (to NASA), GARLAND D. REECE, inventor (to NASA), and STEVE L. GEISSINGER, inventor (to NASA) 31 Dec. 1991 9 p Filed 31 Aug. 1990 Supersedes N91-13684 (29 - 5, p 663) (NASA-CASE-LAR-14340-1-CU; US-PATENT-5,076,103; US-PATENT-APPL-SN-575695; US-PATENT-CLASS-73-708; US-PATENT-CLASS-73-147; US-PATENT-CLASS-73-182; INT-PATENT-CLASS-G01L-19/04) Avail: US Patent and Trademark Office CSCL 14B

An improved static pressure probe containing a water cooling mechanism is disclosed. This probe has a hollow interior containing a central coolant tube and multiple individual pressure measurement tubes connected to holes placed on the exterior. Coolant from the central tube symmetrically immerses the interior of the probe, allowing it to sustain high temperature (in the region of 2500 F) supersonic jet flow indefinitely, while still recording accurate pressure data. The coolant exits the probe body by way of a reservoir attached to the aft of the probe. The pressure measurement tubes are joined to a single, larger manifold in the

reservoir. This manifold is attached to a pressure transducer that records the average static pressure.

Official Gazette of the U.S. Patent and Trademark Office



N92-21710* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

THERMAL REMOTE ANEMOMETER SYSTEM Patent

JOSEPH S. HEYMAN, inventor (to NASA), CHRISTOPHER S. WELCH, inventor (to NASA), WILLIAM E. MILLER, inventor (to NASA), D. MICHELE HEATH, inventor (to NASA), and WILLIAM P. WINFREE, inventor (to NASA) 4 Feb. 1992 6 p Filed 22 Jan. 1988 Supersedes N88-23962 (26 - 17, p 2342) (NASA-CASE-LAR-13508-1; US-PATENT-5,085,073; US-PATENT-APPL-SN-146939; US-PATENT-CLASS-73-147; US-PATENT-CLASS-374-124; US-PATENT-CLASS-374-135; US-PATENT-CLASS-73-204.11; INT-PATENT-CLASS-G01F-9/00) Avail: US Patent and Trademark Office CSCL 14B

A sample in a wind tunnel is radiated from a thermal energy source located outside the wind tunnel. A thermal imager system, also located outside the wind tunnel, reads surface radiations from the sample as a function of time. The the thermal images produced are characteristic of the heat transferred from the sample other the sample to the flow across the sample. In turn, the measured rates of heat loss of the sample are characteristic of the flow and the sample.

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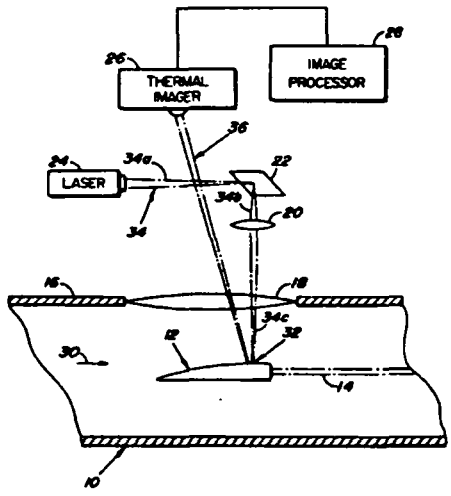

N92-21723* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

ADJUSTABLE DEPTH GAGE Patent

ROGER C. FORSGREN, inventor (to NASA) 17 Mar. 1992 6 p Filed 7 Jul. 1989 Supersedes N90-10415 (28 - 1, p 72) (NASA-CASE-LEW-14880-1; US-PATENT-5,096,340; US-PATENT-APPL-SN-376738; US-PATENT-CLASS-408-14; US-PATENT-CLASS-408-16; US-PATENT-CLASS-408-241S; INT-PATENT-CLASS-B23B-39/00) Avail: US Patent and Trademark Office CSCL 14B

A quick adjust depth gage includes a handle-clamp assembly wherein the clamp includes an opening in which a cylindrical shaft with suitable depth measurement markings thereon is reviewed. Turning the handle on the clamp enables the gage to be set to the desired depth.

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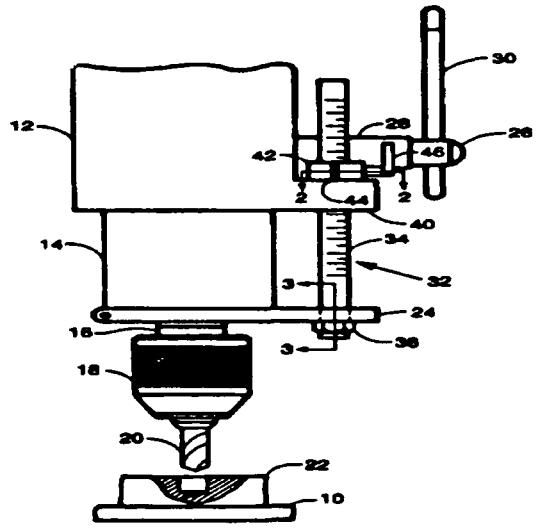


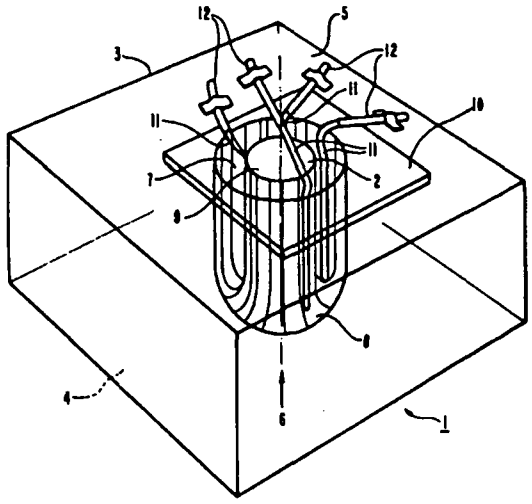
N92-22038* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

METHOD OF PRODUCING A PLUG-TYPE HEAT FLUX GAUGE Patent

CURT H. LIEBERT, inventor (to NASA) and JOHN KOCH, JR., inventor (to NASA) 4 Feb. 1992 6 p Filed 8 Apr. 1991 Supersedes N91-23460 (29 - 15, p 2430) Division of US-Patent-Appl-SN-531433, filed 31 May 1990 (NASA-CASE-LEW-14967-2; US-PATENT-5,086,204; US-PATENT-APPL-SN-685062; US-PATENT-APPL-SN-531433; US-PATENT-CLASS-219-69.17; US-PATENT-CLASS-374-29; US-PATENT-CLASS-40-703; INT-PATENT-CLASS-B23H-9/00) Avail: US Patent and Trademark Office CSCL 14B

A method of making a plug-type heat flux gauge in a material specimen in which a thermoplug is integrally formed in the specimen is disclosed. The thermoplug and concentric annulus are formed in the material specimen by electrical discharge machining and trepanning procedures. The thermoplug is surrounded by a concentric annulus through which thermocouple wires are routed. The end of each thermocouple wire is welded to the thermoplug, with each thermocouple wire welded at a

different location along the length of the thermoplug.
Official Gazette of the U.S. Patent and Trademark Office



N92-22039* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
TWO DIMENSIONAL VERNIER Patent
RICHARD D. JUDAY, inventor (to NASA) 28 Jan. 1992
8 p Filed 14 Jan. 1991 Supersedes N91-23462 (29 - 15, p 2430)
(NASA-CASE-MSC-21700-1; US-PATENT-5,083,378;
US-PATENT-APPL-SN-640775; US-PATENT-CLASS-33-10;
US-PATENT-CLASS-33-15D; US-PATENT-CLASS-33-520;
US-PATENT-CLASS-33-644; INT-PATENT-CLASS-G01B-5/02)
Avail: US Patent and Trademark Office CSCL 14B

A two-dimensional vernier scale is disclosed utilizing a cartesian grid on one plate member with a polar grid on an overlying transparent plate member. The polar grid has multiple concentric circles at a fractional spacing of the spacing of the cartesian grid lines. By locating the center of the polar grid on a location on the cartesian grid, interpolation can be made of both the X and Y fractional relationship to the cartesian grid by noting which circles coincide with a cartesian grid line for the X and Y direction.
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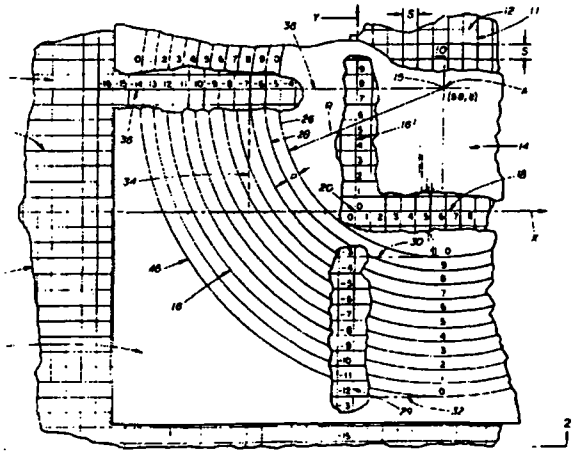

36
LASERS AND MASERS

Includes parametric amplifiers.

N92-16290* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
BIREFRINGENT FILTER DESIGN Patent
CLAYTON H. BAIR, inventor (to NASA) 5 Nov. 1991
10 p Filed 8 Apr. 1991 Supersedes N91-23472 (29 - 15, p 2432)
(NASA-CASE-LAR-13887-1; US-PATENT-5,062,694;
US-PATENT-APPL-SN-681288; US-PATENT-CLASS-359-498;
US-PATENT-CLASS-372-105; INT-PATENT-CLASS-G02B-27/28)
Avail: US Patent and Trademark Office CSCL 20E

A birefringent filter is provided for tuning the wavelength of a broad band emission laser. The filter comprises thin plates of a birefringent material having thicknesses which are non-unity, integral multiples of the difference between the thicknesses of the two thinnest plates. The resulting wavelength selectivity is substantially equivalent to the wavelength selectivity of a conventional filter which has a thinnest plate having a thickness equal to this thickness difference. The present invention obtains an acceptable tuning of the wavelength while avoiding a decrease in optical quality associated with conventional filters wherein the respective plate thicknesses are integral multiples of the thinnest plate.
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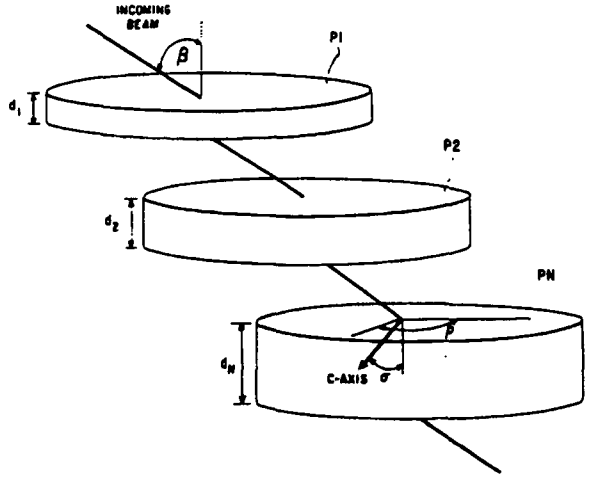
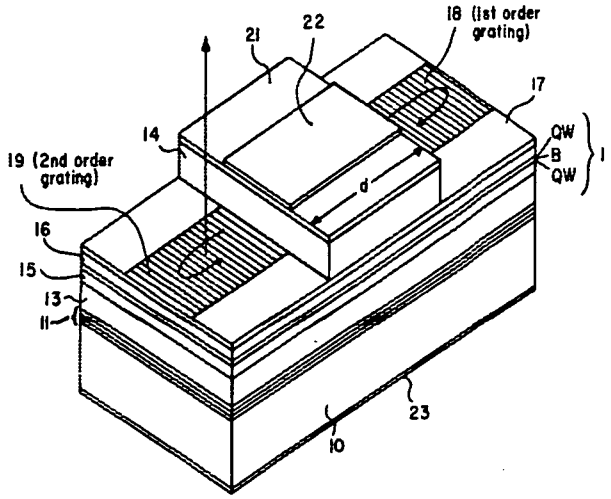


N92-17862*# National Aeronautics and Space Administration. Pasadena Office, CA.
MULTIPERIOD-GRATING SURFACE-EMITTING LASERS Patent Application
ROBERT J. LANG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 21 Oct. 1991 28 p
(Contract NAS7-918)
(NASA-CASE-NPO-17763-1-CU; NAS 1.71:NPO-17763-1-CU;
US-PATENT-APPL-SN-782009) Avail: NTIS HC/MF A03 CSCL 20E

Surface-emitting distributed feedback (DFB) lasers are disclosed with hybrid gratings. A first-order grating is provided at one or both ends of the active region of the laser for retroreflection of light back into the active region, and a second-order or nonresonant grating is provided at the opposite end for coupling light out perpendicular to the surfaces of the laser or in some

other selected direction. The gratings may be curved to focus light retroreflected into the active region and to focus light coupled out to a point. When so focused to a point, the DFB laser may be part of a monolithic read head for a laser recorded disk, or an optical coupler into an optical fiber.

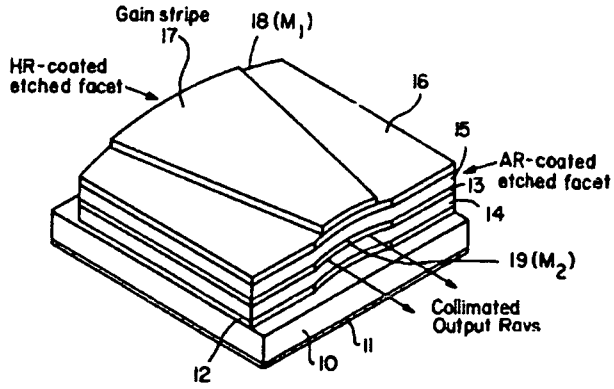
NASA



N92-17899*# National Aeronautics and Space Administration. Pasadena Office, CA.
SELF-COLLIMATED UNSTABLE RESONATOR SEMICONDUCTOR LASER Patent Application
ROBERT J. LANG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 28 Aug. 1991 17 p
(Contract NAS7-918)
(NASA-CASE-NPO-18386-1-CU; NAS 1.71:NPO-18386-1-CU; US-PATENT-APPL-SN-751440) Avail: NTIS HC/MF A03 CSCL 20E

Self-collimation of the output is achieve dinanuns table reson at or semiconductor laser by providing a large concave mirror(Msub 1) and a small convex mirror (M sub 2) on opposite surfaces of a semiconductor body of a material having an effective index of refraction denoted by n, where the respective mirror radii (R sub 1, R sub 2) and beam radii (r sub 1, r sub 2) are chosen to satisfy a condition (R sub 2)/(1+r sub 1) = (n-1)/n, with a value of geometric magnification 1 less than or equal to M less than or equal to (n+1)/(n-1) where r (sub 1) and r (sub 2) are the radii of counterpropagating beams at respective mirrors of radii R (sub 1) and R (sub 2).

NASA



37
MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

N92-10197* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
MECHANIZED FLUID CONNECTOR AND ASSEMBLY TOOL SYSTEM WITH BALL DETENTS Patent
RONALD C. ZENTNER, inventor (to NASA) and STEVEN A. SMITH, inventor (to NASA) 22 Oct. 1991 10 p Filed 9 Nov. 1989 Supersedes N90-17138 (28 - 9, p 1230)
(NASA-CASE-MSC-21434-1; US-PATENT-5,058,929; US-PATENT-APPL-SN-433881; US-PATENT-CLASS-285-39; US-PATENT-CLASS-285-353; US-PATENT-CLASS-285-23; US-PATENT-CLASS-285-912; INT-PATENT-CLASS-F16L-15/00)
Avail: US Patent and Trademark Office CSCL 13K

A fluid connector system is disclosed which includes a modified plumbing union having a rotatable member for drawing said union into a fluid tight condition. A drive tool is electric motor actuated and includes a reduction gear train providing an output gear engaging an integral peripheral spur gear on the rotatable member. Coaxial alignment means are attached to both the connector assembly and the drive tool. A hand lever actuated latching system includes a plurality of circumferentially spaced latching balls selectively wedged against the alignment means attached to the connector assembly or to secure the drive tool with its output gear in mesh with the integral peripheral spur gear. The drive motor is torque, speed, and direction controllable.

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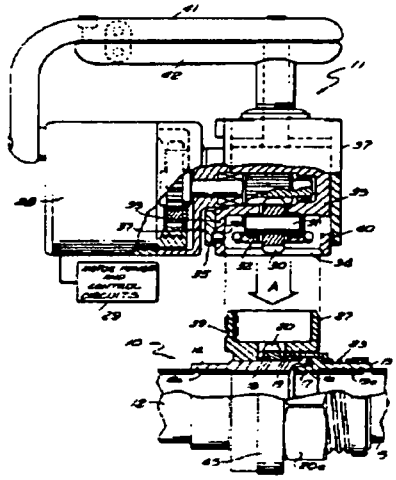
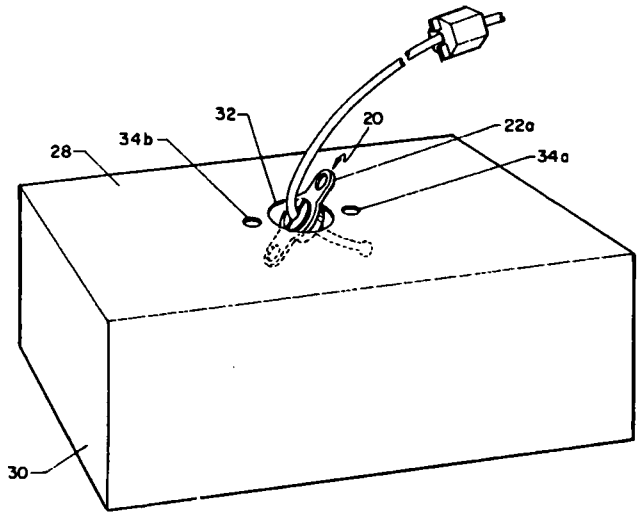


N92-11354*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
BLIND FASTENING APPARATUS Patent Application
NORMAN F. WILLEY, inventor (to NASA) and JAMES F. LINKER, inventor (to NASA) 8 Aug. 1991 14 p
(NASA-CASE-LAR-14542-1; NAS 1.71:LAR-14542-1; US-PATENT-APPL-SN-743489) Avail: NTIS HC/MF A03 CSCL 13K

An anchor nut insert is provided having external threads for engaging an internally threaded receptacle of a fixture to be installed. The fixture also has two side wings flanking the receptacle and having fastener holes. An insert driver is provided having a projecting blade which engages a slot in the anchor nut insert for

driving the insert. A guide member, such as a wire, passes through symmetry axes of the anchor nut insert and insert driver such that the anchor nut insert is located between the insert driver and a first terminal end of the guide wire. A swag is provided on this terminal end to prevent the anchor nut insert and insert driver from sliding off the end. The fixture with the installed anchor nut insert is fed through the central hole in a structure wall having a blind side. The fixture is rotated until the wing holes are aligned with side holes in the wall and then the fixture is pulled flush against the blind side via the guide wire. Fasteners are then inserted through the hole and the anchor nut insert removed via the driver, exposing the fixed threaded receptacle for engagement as desired.

NASA



N92-11359*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

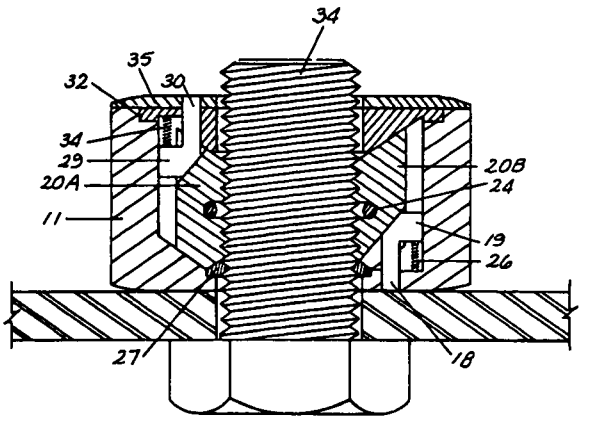
QUICK APPLICATION/RELEASE NUT WITH ENGAGEMENT INDICATOR Patent Application

JAY M. WRIGHT, inventor (to NASA) 13 Sep. 1991 18 p

(NASA-CASE-MSC-21799-1; NAS 1.71:MSC-21799-1; US-PATENT-APPL-SN-759367) Avail: NTIS HC/MF A03 CSCL 13K

A composite nut is shown which permits a fastener to be inserted or removed from either side with an indicator of fastener engagement. The nut has a plurality of segments, preferably at least three segments, which are internally threaded, spring loaded apart by an internal spring, and has detents on opposite sides which force the nut segments into operative engagements with a threaded member when pushed in and release the segments for quick insertion or removal of the nut when moved out. When the nut is installed, end pressure on one of the detents presses the nut segments into operative engagement with a threaded member where continued rotation locks the structure together with the detents depressed to indicate positive locking engagement of the nut. On removal, counterclockwise rotation of the nut relieves the endwise pressure on the detents permitting internal springs to force the detents outward and allowing the nut segments to move outward and separate to permit quick removal of the fastener.

NASA



N92-16318* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

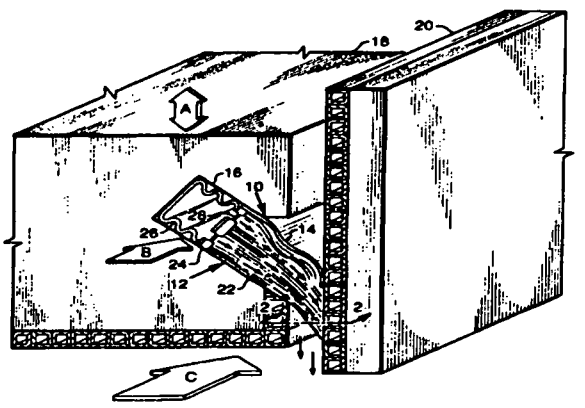
HIGH TEMPERATURE, FLEXIBLE PRESSURE-ACTUATED, BRUSH SEAL Patent

BRUCE M. STEINETZ, inventor (to NASA) and PAUL J. SIROCKY, inventor (to NASA) 31 Dec. 1991 8 p Filed 26 Nov. 1990

(NASA-CASE-LEW-15086-1; US-PATENT-5,076,590; US-PATENT-APPL-SN-617752; US-PATENT-CLASS-277-53; US-PATENT-CLASS-277-27; US-PATENT-CLASS-239-127.1; US-PATENT-CLASS-239-127.3; INT-PATENT-CLASS-F16J-15/32) Avail: US Patent and Trademark Office CSCL 13I

A high temperature, flexible brush seal comprises a bundle of fibers or bristles held tightly together and secured at one end with a backing plate. The assembly includes a secondary spring-clip having one end anchored to the brush seal backing plate. An alternate embodiment of the seal utilizes a metal bellows containing coolant holes. Another embodiment of the seal uses non-circular cross-sectional fibers which may be square, rectangular or hexagonal in cross section.

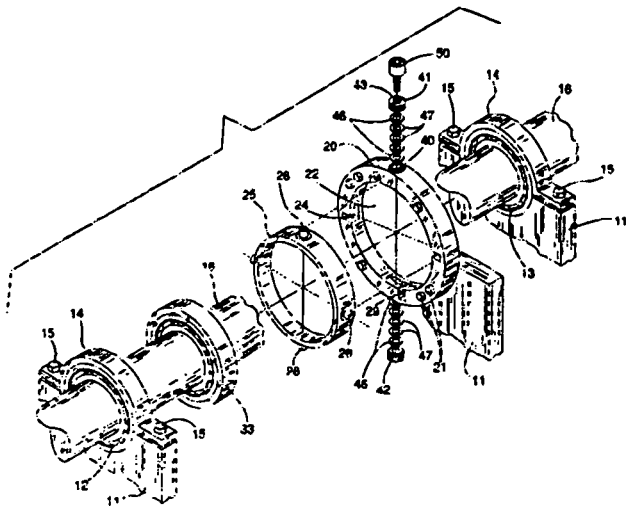
Official Gazette of the U.S. Patent and Trademark Office



N92-17584*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
SYSTEM FOR TESTING BEARINGS Patent Application
JOHN GIBSON, inventor (to NASA) 26 Dec. 1991 8 p
(NASA-CASE-MFS-28589-1; NAS 1.71:MFS-28589-1; US-PATENT-APPL-SN-813628) Avail: NTIS HC/MF A02 CSCL 13I

Disclosed here is a system for testing bearings wherein a pair of spaced bearings provides support for a shaft on which is mounted a bearing to be tested, this bearing being mounted in a bearing holder spaced from and in alignment with the pair of bearings. The bearing holder is provided with an annular collar positioned in an opening in the bearing holder for holding the bearing to be tested. A screw threaded through the bearing holder into engagement with the annular collar can be turned to force the collar radially out of alignment with the pair of bearings to apply a radial load to the bearing.

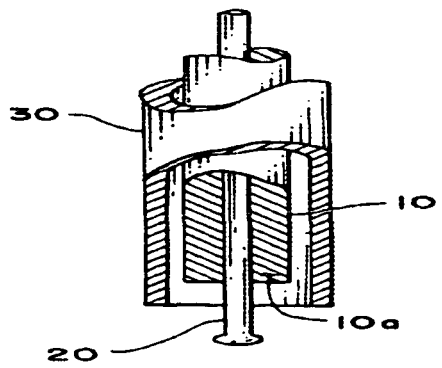
NASA



N92-17677*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
SUBSTANTIALLY OXYGEN-FREE CONTACT TUBE Patent Application
JAMES F. PIKE, inventor (to NASA) 14 Nov. 1991 8 p
(NASA-CASE-LAR-14169-1; NAS 1.71:LAR-14169-1; US-PATENT-APPL-SN-791728) Avail: NTIS HC/MF A02 CSCL 13I

A device for arc welding is provided in which a continuously-fed electrode wire is in electrical contact with a contact tube. The contact tube is improved by using a substantially oxygen-free conductive alloy in order to reduce the amount of electrical erosion.

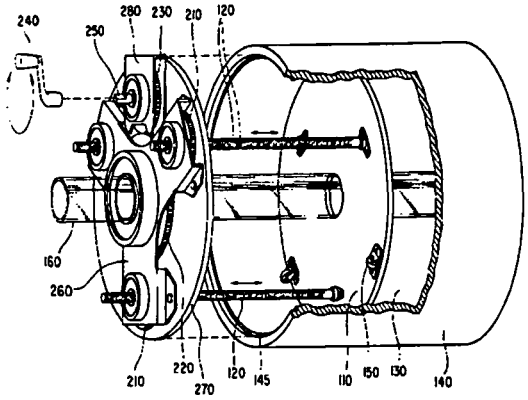
NASA



N92-17678*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
THREE POINT LEAD SCREW POSITIONING APPARATUS Patent Application
FRANK S. CALCO, inventor (to NASA) 27 Jan. 1992 16 p
(NASA-CASE-LEW-15216-1; NAS 1.71:LEW-15216-1; US-PATENT-APPL-SN-826547) Avail: NTIS HC/MF A03 CSCL 13K

Three lead screws are provided for adjusting the position of a traversing plate. Each of the three lead screws is threaded through a collar that is press fitted through the center of one of three pinion gears. A sun gear meshes with all three pinion gears and transversely moves the three lead screws upon actuation of a drive gear. The drive gear meshes with the sun gear and is driven by a handle or servomotor. When the handle or servomotor rotates the drive gear, the sun gear rotates causing the three pinion gears to rotate, thus, causing transverse movement of the three lead screws and, accordingly, transverse movement of the transversing plate. When the drive gear rotates, the traversing plate is driven in and out of a microwave cavity. Thus, the length or size of the cavity can be tuned while maintaining the traversing plate in an exact parallel relationship with an opposing plate on another end of the cavity.

NASA

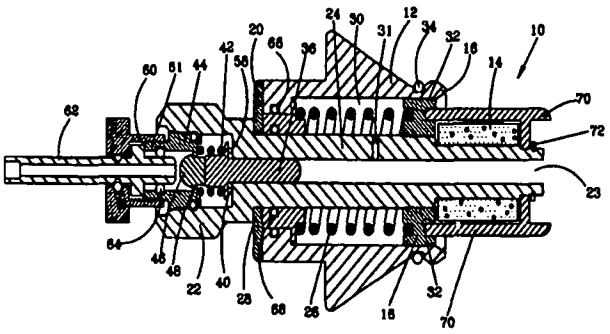


N92-17872*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
THRUSTER SEALING SYSTEM AND APPARATUS Patent Application
PAUL A. SVEJKOVSKY, inventor (to NASA) (Lockheed Engineering and Sciences Co., Houston, TX.) 22 Oct. 1991 20 p
(NASA-CASE-MSC-21898-1; NAS 1.71:MSC-21898-1; US-PATENT-APPL-SN-780512) Avail: NTIS HC/MF A03 CSCL 13I

A thruster nozzle sealing system and apparatus is provided for protection of spacecraft thruster motors. The system includes a sealing plug, a sealing plug insertion tool, an outer cover, an outer cover attachment, and a ferry flight attachment. The sealing plug prevents moisture from entering the thruster engine so as to prevent valve failure. The attachments are interchangeably connectable with the sealing plug. The ferry flight attachment is used during air transportation of the spacecraft,

and the outer cover attachment is used during storage and service of the spacecraft. The outer cover provides protection to the thruster nozzle from mechanical damage.

NASA



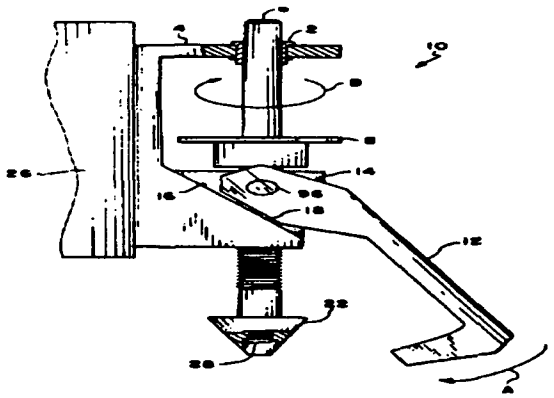
N92-21500* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.

J-HOOK LATCHING DEVICE Patent

MALCOLM B. MILAM, inventor (to NASA) 11 Feb. 1992
13 p Filed 13 Feb. 1991
(NASA-CASE-GSC-13200-1; US-PATENT-5,087,088; US-PATENT-APPL-SN-654454; US-PATENT-CLASS-292-110; US-PATENT-CLASS-292-DIG.39; INT-PATENT-CLASS-E05C-5/02)
Avail: US Patent and Trademark Office CSCL 13K

Described here is a latching device for latching two items together that has a housing and a shaft mounted to one item such that rotation of the shaft by a sprocket causes the shaft to move longitudinally up and down. The shaft has one end extending beyond the housing with an alignment cone attached to this end for engaging a receptor on the other item. A latch mounted to a shaft by a traveling nut provides a pivot point for the latch so that rotation of the shaft causes the pivot point of the latch to translate along the longitudinal axis of the shaft. Camming surfaces and a camming spring are used for rotating the latch so that the latch will engage and disengage a receptor on the other item.

Official Gazette of the U.S. Patent and Trademark Office



N92-21726* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

METALLIC THREADED COMPOSITE FASTENER Patent

THOMAS J. DUNN, inventor (to NASA) 25 Feb. 1992
7 p Filed 31 Jan. 1991 Supersedes N91-23491 (29 - 15, p 2435)
(NASA-CASE-MSC-21580-1; US-PATENT-5,090,857; US-PATENT-APPL-SN-648772; US-PATENT-CLASS-411-385; US-PATENT-CLASS-411-65; US-PATENT-CLASS-411-354; US-PATENT-CLASS-411-901; US-PATENT-CLASS-411-908; INT-PATENT-CLASS-F16B-19/00; INT-PATENT-CLASS-F16B-35/02)
Avail: US Patent and Trademark Office CSCL 13K

A metallic threaded composite fastener, particularly suited for high temperature applications, has a body member made of high temperature resistant composite material with a ceramic coating. The body member has a head portion configured to be installed in a countersunk hole and a shank portion which is noncircular and tapered. One part of the shank may be noncircular and the other part tapered, or the two types of surface could be combined into a frustum of a noncircular cone. A split collar member made of high strength, high temperature tolerant metal alloy is split into two halves and the interior of the halves are configured to engage the shank. The exterior of the collar has a circumferential groove which receives a lock ring to secure the collar halves to the shank. In the assembled condition torque may be transmitted from the body to the split collar by the engaged noncircular portions to install and remove the fastener assembly into or from a threaded aperture and shear loads in the collar threads are transferred to the shank tapered portion as a combination of radial compression and axial tension loads. Thus, tension loads may be applied to the fastener shank without damaging the ceramic coating.

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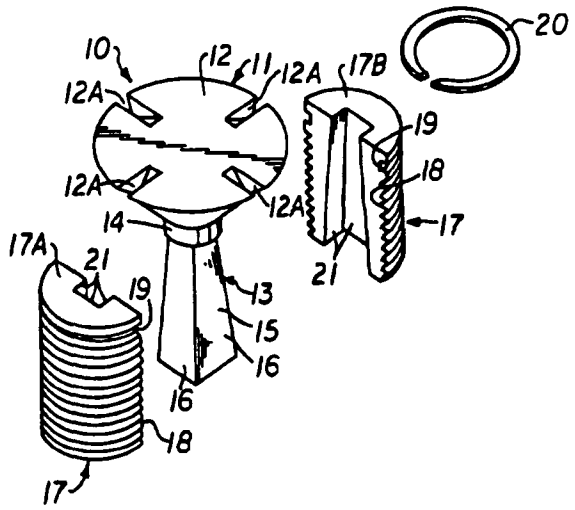

N92-21727* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

PRESSURE VESSEL FLEX JOINT Patent

JON B. KAHN, inventor (to NASA) 7 Apr. 1992 13 p
Filed 19 Feb. 1991 Supersedes N91-25415 (29 - 17, p 2785)
(NASA-CASE-MSC-21748-1; US-PATENT-5,102,150; US-PATENT-APPL-SN-657598; US-PATENT-CLASS-277-3; US-PATENT-CLASS-277-34; US-PATENT-CLASS-277-34.3; US-PATENT-CLASS-285-97; US-PATENT-CLASS-285-223; US-PATENT-CLASS-285-346; US-PATENT-CLASS-285-910)
Avail: US Patent and Trademark Office CSCL 13I

An airtight, flexible joint is disclosed for the interfacing of two pressure vessels such as between the Space Station docking

tunnel and the Space Shuttle Orbiter bulkhead adapter. The joint provides for flexibility while still retaining a structural link between the two vessels required due to the loading created by the internal/external pressure differential. The joint design provides for limiting the axial load carried across the joint to a specific value, a function returned in the Orbiter/Station tunnel interface. The flex joint comprises a floating structural segment which is permanently attached to one of the pressure vessels through the use of an inflatable seal. The geometric configuration of the joint causes the tension between the vessels created by the internal gas pressure to compress the inflatable seal. The inflation pressure of the seal is kept at a value above the internal/external pressure differential of the vessels in order to maintain a controlled distance between the floating segment and pressure vessel. The inflatable seal consists of either a hollow torus-shaped flexible bladder or two rolling convoluted diaphragm seals which may be reinforced by a system of straps or fabric anchored to the hard structures. The joint acts as a flexible link to allow both angular motion and lateral displacement while it still contains the internal pressure and holds the axial tension between the vessels.

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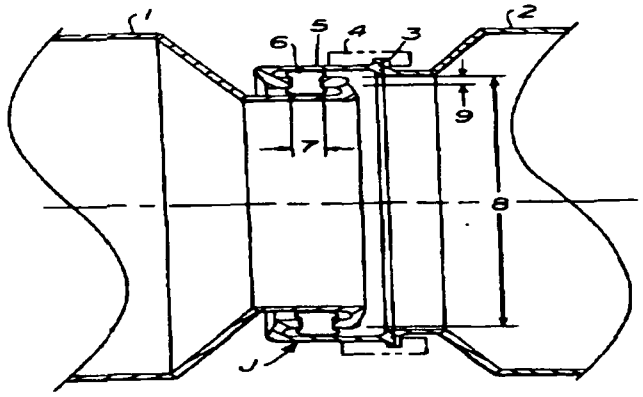
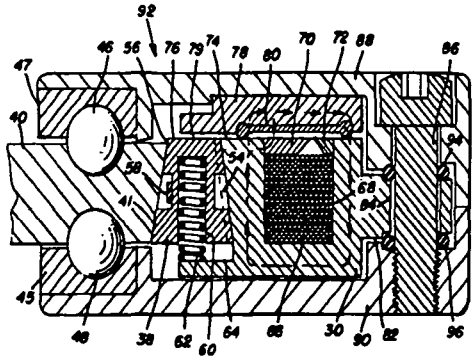


N92-21728* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
ROLLER LOCKING BRAKE Patent
JOHN M. VRANISH, inventor (to NASA) 14 Apr. 1992
8 p Filed 28 Mar. 1991 Supersedes N91-28579 (29 - 20, p 3354)
(NASA-CASE-GSC-13376-1; US-PATENT-5,103,941;
US-PATENT-APPL-SN-677008; US-PATENT-CLASS-188-171;
US-PATENT-CLASS-188-82.84; US-PATENT-CLASS-188-82.9;
INT-PATENT-CLASS-B60T-13/04) Avail: US Patent and Trademark Office CSCL 13I

A roller locking brake structure is described. The structure includes a roller locking/lifting ring, a housing, a set of conical locking rollers, a striker ring, and a drive disc. The roller locking/lifting ring includes respective V-shaped locking cam surface segments for each locking roller which is in the form of a truncated cone and provides a force and torque reaction surface for forces and torques generated in the braking process as well as providing a channel for a magnetic coil and flux return path of a magnetic circuit used to release a conical roller when the brake is off. The locking conical rollers couple the ring to the rim surfaces of the drive disc which provides another cam surface. The striker ring is located next to the rollers and is pulled down against the small end of the rollers by an electromagnetic coil when energized to decouple the locking rollers from the drive disc and thus cease the braking action.

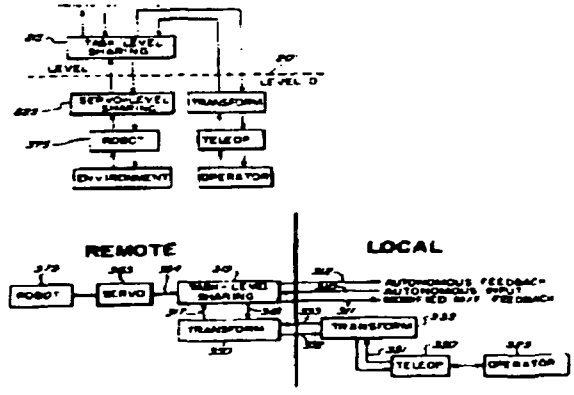
Official Gazette of the U.S. Patent and Trademark Office



N92-22036* National Aeronautics and Space Administration. Pasadena Office, CA.
BILEVEL SHARED CONTROL FOR TELEOPERATORS Patent
SAMAD A. HAYATI, inventor (to NASA) and SUBRAMANIAN T. VENKATARAMAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 4 Feb. 1992 21 p Filed 11 May 1990 Supersedes N91-13724 (29 - 5, p 670)
(NASA-CASE-NPO-17800-1-CU; US-PATENT-5,086,400;
US-PATENT-APPL-SN-522949; US-PATENT-CLASS-395-95;
US-PATENT-CLASS-901-6; US-PATENT-CLASS-395-86;
INT-PATENT-CLASS-G06F-15/00) Avail: US Patent and Trademark Office CSCL 13I

A shared system is disclosed for robot control including integration of the human and autonomous input modalities for an improved control. Autonomously planned motion trajectories are modified by a teleoperator to track unmodelled target motions, while nominal teleoperator motions are modified through compliance to accommodate geometric errors autonomously in the latter. A hierarchical shared system intelligently shares control over a remote robot between the autonomous and teleoperative portions of an overall control system. Architecture is hierarchical, and consists of two levels. The top level represents the task level, while the bottom, the execution level. In space applications, the performance of pure teleoperation systems depend significantly on the communication time delays between the local and the remote sites. Selection/mixing matrices are provided with entries which reflect how each input's signals modality is weighted. The shared control minimizes the detrimental effects caused by these time delays between earth and space.

Official Gazette of the U.S. Patent and Trademark Office



N92-22043* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
HIGH TEMPERATURE, FLEXIBLE, FIBER-PREFORM SEAL Patent
BRUCE M. STEINETZ, inventor (to NASA) and PAUL J. STROCKY, inventor (to NASA) 21 Jan. 1992 8 p Filed 9 Nov. 1990
(NASA-CASE-LEW-15085-1; US-PATENT-5,082,293; US-PATENT-APPL-SN-610879; US-PATENT-CLASS-277-3; US-PATENT-CLASS-239-265.11; US-PATENT-CLASS-277-34; US-PATENT-CLASS-277-76; US-PATENT-CLASS-277-229; US-PATENT-CLASS-277-234; INT-PATENT-CLASS-F16J-15/46) Avail: US Patent and Trademark Office CSCL 11A

A seal is mounted in a rectangular groove in a movable structural panel. The seal comprises a fiber preform constructed of multiple layers of fiber having a uniaxial core. Helical fibers are wound over the core. The fibers are of materials capable of withstanding high temperatures and are both left-hand and right-hand wound. An outer layer wrapped over said helical fibers prevents abrasion damage.

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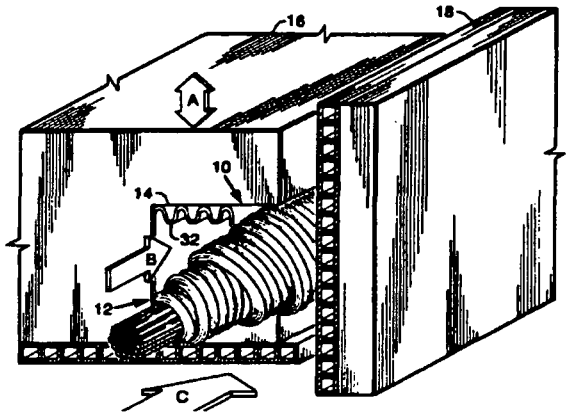


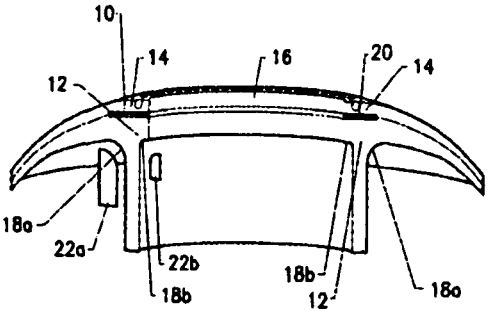
38
QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N92-17859*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A METHOD AND APPARATUS FOR INDICATING DISBONDS IN JOINT REGIONS Patent Application
ERIC I. MADARAS, inventor (to NASA) 29 Aug. 1991 13 p
(NASA-CASE-LAR-14626-1; NAS 1.71:LAR-14626-1; US-PATENT-APPL-SN-751489) Avail: NTIS HC/MF A03 CSCL 14D

A method for indicating disbonds in joint regions is discussed. A critical bondline region is located between a first material and a second material having a higher acoustic impedance than the first material. A form member having an acoustic impedance which is substantially similar to the first material has a first face which is form fitted to a surface of the first material opposite to and non-parallel with the critical bondline region. The form member has an opposite second face which is shaped to be parallel to the critical bondline region. Transducers are acoustically coupled to the second face of the form member to generate an ultrasonic tone burst through the acoustically similar form member and first material which is reflected by the critical bondline region. This reflected tone burst is received and a resulting signal is compared with a normal signal for no disbond to determine the presence of an unacceptable disbond.

NASA



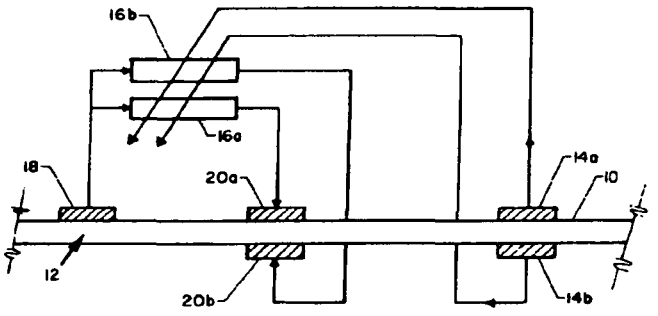
39
STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

N92-10202*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
MULTI-DEGREE OF FREEDOM, ACTIVE VIBRATION CONTROL METHOD, AND SYSTEM Patent Application
RICHARD J. SILCOX, inventor (to NASA), CHRIS R. FULLER, inventor (to NASA), and GARY P. GIBBS, inventor (to NASA) (Virginia Polytechnic Inst. and State Univ., Blacksburg.) 4 Mar. 1991 27 p
(NASA-CASE-LAR-14508-1-CU; NAS 1.71:LAR-14508-1-CU; US-PATENT-APPL-SN-664194) Avail: NTIS HC/MF A03 CSCL 20K

Arrays of actuators are affixed to structural elements to impede the transmission of vibrational energy. A single pair is used to provide control of bending and extensional waves and two pairs are used to control torsional motion. The arrays are applied to a wide variety of structural elements such as a beam structure that is part of a larger framework that may or may not support a rigid or non-rigid skin. Electrical excitation is applied to the actuators that generate forces on the structure. These electrical inputs may be adjusted in their amplitude and phase by a controller in communication with appropriate vibrational wave sensors to impede the flow of vibrational power in all of the above mentioned wave forms beyond the actuator location. Additional sensor elements can be used to monitor the performance and adjust the electrical inputs to maximize the attenuation of vibrational energy.

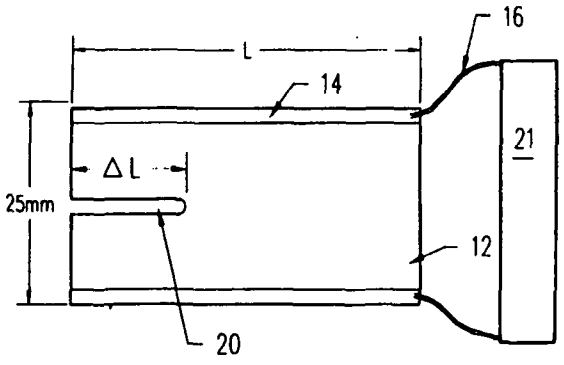
NASA



N92-11374*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
CONDUCTIVE GAGE FOR CRACK LENGTH MEASUREMENT Patent Application
RAMAMURTHY PRABHAKARAN, inventor (to NASA) (Old Dominion Univ., Norfolk, VA.) and OSVELDO F. LOPEZ, inventor (to NASA) 24 May 1991 22 p
(NASA-CASE-LAR-14480-1-CU; NAS 1.71:LAR-14480-1-CU; US-PATENT-APPL-SN-705474) Avail: NTIS HC/MF A03 CSCL 20K

The determination of crack lengths in an accurate and straight forward manner is very useful in studying and preventing load created flaws and cracks. A crack length sensor according to the present invention is fabricated in a rectangular or other geometrical form from a conductive powder impregnated polymer material. The long edges of the sensor are silver painted on both sides and the sensor is then bonded to a test specimen via an adhesive having sufficient thickness to also serve as an insulator. A lead wire is connected to each of the two outwardly facing silver painted edges. The resistance across the sensor changes as a function of the crack length in the specimen and sensor. The novel aspect of the present invention include the use of relatively uncomplicated sensors and instrumentation to effectively measure the length of generated cracks.

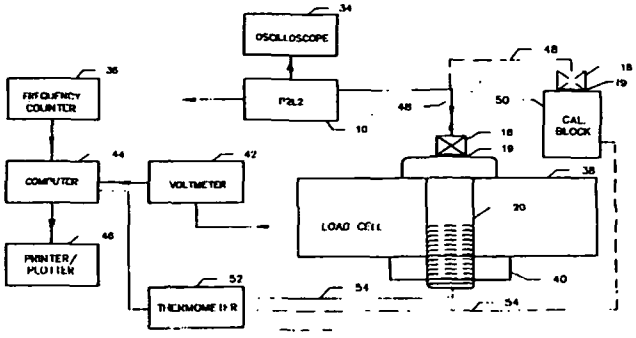
NASA



N92-11384*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD OF RECERTIFYING A LOADED BEARING MEMBER USING A PHASE POINT Patent Application
JOSEPH S. HEYMAN, inventor (to NASA) 19 Jun. 1991 25 p
(NASA-CASE-LAR-14741-1; NAS 1.71:LAR-14741-1; US-PATENT-APPL-SN-720153) Avail: NTIS HC/MF A03 CSCL 20K

A method of recertifying a load on a bearing member using a pulsed phase locked loop (P2L2) system is disclosed. A first tone burst signal with a corresponding first phase signal is generated in the bearing member in a first load condition. The sample/hold of the P2L2 is adjusted to a determined phase point on the first phase signal and then the P2L2 is locked at this phase period to determine a first load measurement. Next, the phase sample point is correlated with a corresponding position, w, on the first tone burst signal. A second tone burst with a corresponding second phase signal is then generated at some later time in the bearing member in a second load condition. The sample/hold is adjusted to the sample/hold phase point as before and then the output frequency of the P2L2 is adjusted until the sample/hold is positioned at the previously determined phase point corresponding to position w on the second tone burst signal. The P2L2 is then locked at this phase point to determine a frequency indicative of the load of the second loading condition.

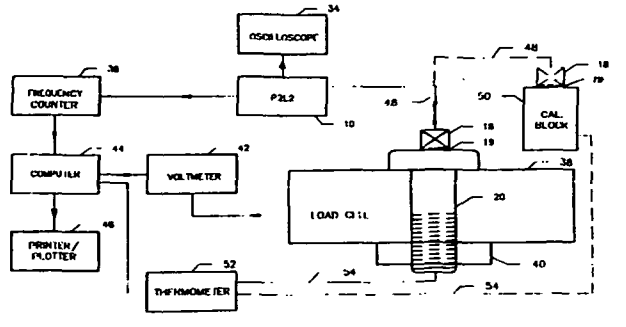
NASA



N92-12302*# National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
METHOD OF RECERTIFYING A LOADED BEARING MEMBER Patent Application
SIDNEY G. ALLISON, inventor (to NASA) 19 Jun. 1991 25 p
(NASA-CASE-LAR-14168-1; NAS 1.71:LAR-14168-1; US-PATENT-APPL-SN-717755) Avail: NTIS HC/MF A03 CSCL 20K

A method is described of recertifying a loaded bearing member using ultrasound testing to compensate for different equipment configurations and temperature conditions. The standard frequency F1 of a reference block is determined via an ultrasonic tone burst generated by a first pulsed phased locked loop (P2L2) equipment configuration. Once a lock point number S is determined for F1, the reference frequency F1a of the reference block is determined at this lock point number via a second P2L2 equipment configuration to permit an equipment offset compensation factor Fo1=((F1-F1a)/F1)(1000000) to be determined. Next, a reference frequency F2 of the unloaded bearing member is determined using a second P2L2 equipment configuration and is then compensated for equipment offset errors via the relationship F2+F2(Fo1)/1000000. A lock point number b is also determined for F2. A resonant frequency F3 is determined for the reference block using a third P2L2 equipment configuration to determine a second offset compensation factor F02=((F1-F3)/F1) 1000000. Next the resonant frequency F4 of the loaded bearing member is measured at lock point number b via the third P2L2 equipment configuration and the bolt load determined by the relationship (-1000000)CI(((F2-F4)/F2)-Fo2), wherein CI is a factor correlating measured frequency shift to the applied load. Temperature compensation is also performed at each point in the process

NASA



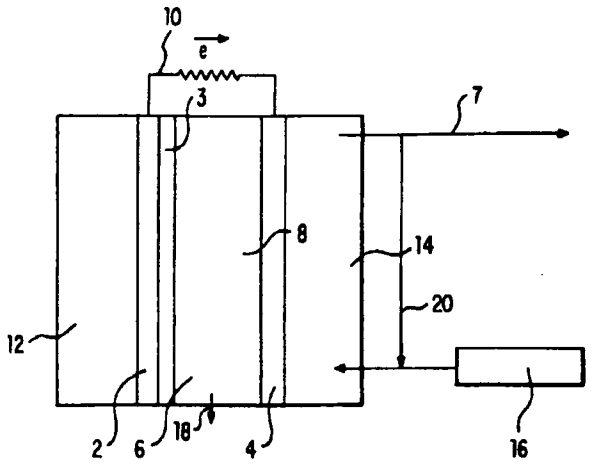
44
ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower.

N92-10222*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
ALKALI METAL CARBON DIOXIDE ELECTROCHEMICAL SYSTEM FOR ENERGY STORAGE AND/OR CONVERSION OF CARBON DIOXIDE TO OXYGEN Patent Application
NORMAN H. HAGEDORN, inventor (to NASA) 26 Sep. 1991
15 p
(NASA-CASE-LEW-14973-1; NAS 1.71:LEW-14973-1; US-PATENT-APPL-SN-766593) Avail: NTIS HC/MF A03 CSCL 10C

An alkali metal, such as lithium, is the anodic reactant, carbon dioxide or a mixture of carbon dioxide and carbon monoxide is the cathodic reactant, and carbonate of the alkali metal is the electrolyte in an electrochemical cell for the storage and delivery of electrical energy. Additionally, alkali metal-carbon dioxide battery systems include a plurality of such electrochemical cells. Gold is a preferred catalyst for reducing the carbon dioxide at the cathode. The fuel cell of the invention produces electrochemical energy through the use of an anodic reactant which is extremely energetic and light, and a cathodic reactant which can be extracted from its environment and therefore exacts no transportation penalty. The invention is therefore especially useful in extraterrestrial environments.

NASA



N92-16457* National Aeronautics and Space Administration. Pasadena Office, CA.
THERMAL POWER TRANSFER SYSTEM USING APPLIED POTENTIAL DIFFERENCE TO SUSTAIN OPERATING PRESSURE DIFFERENCE Patent
PRADEEP BHANDARI, inventor (to NASA) and TOSHIO FUJITA, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 19 Nov. 1991 7 p Filed 16 Aug. 1990 Supersedes N91-13796 (29 - 5, p 683)
(NASA-CASE-NPO-18034-1-CU; US-PATENT-5,066,337; US-PATENT-APPL-SN-568130; US-PATENT-CLASS-136-202; US-PATENT-CLASS-136-205; US-PATENT-CLASS-429-11; US-PATENT-CLASS-429-120; INT-PATENT-CLASS-H01L-37/00) Avail: US Patent and Trademark Office CSCL 10B

A thermal power transfer system using a phase change liquid gas fluid in a closed loop configuration has a heat exchanger member connected to a gas conduit for inputting thermal energy into the fluid. The pressure in the gas conduit is higher than a liquid conduit that is connected to a heat exchanger member for outputting thermal energy. A solid electrolyte member acts as a barrier between the gas conduit and the liquid conduit adjacent to a solid electrolyte member. The solid electrolyte member has the capacity of transmitting ions of a fluid through the electrolyte member. The ions can be recombined with electrons with the assistance of a porous electrode. An electrical field is applied across the solid electrolyte member to force the ions of the fluid from a lower pressure liquid conduit to the higher pressure gas conduit.

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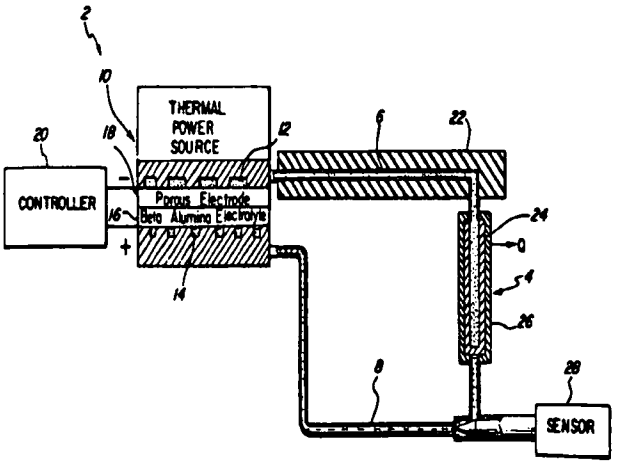

N92-22037* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
SELECTIVE EMITTERS Patent
DONALD L. CHUBB, inventor (to NASA) 14 Jan. 1992
8 p Filed 30 Mar. 1990 Supersedes N91-13802 (29 - 5, p 684)
(NASA-CASE-LEW-14731-1; US-PATENT-5,080,724; US-PATENT-APPL-SN-503486; US-PATENT-CLASS-136-253; INT-PATENT-CLASS-H01C-31/58) Avail: US Patent and Trademark Office CSCL 10A

This invention relates to a small particle selective emitter for converting thermal energy into narrow band radiation with high efficiency. The small particle selective emitter is used in combination with a photovoltaic array to provide a thermal to electrical energy conversion device. An energy conversion apparatus of this type is called a thermo-photovoltaic device. In the first embodiment, small diameter particles of a rare earth oxide are suspended in an inert gas enclosed between concentric cylinders. The rare earth oxides are used because they have the desired property of large emittance in a narrow wavelength band and small emittance outside the band. However, it should be emphasized that it is the smallness of the particles that enhances the radiation property. The small particle selective emitter is surrounded by a photovoltaic array. In an alternate embodiment, the small particle gas mixture is circulated through a thermal energy

source. This thermal energy source can be a nuclear reactor, solar receiver, or combustor of a fossil fuel.

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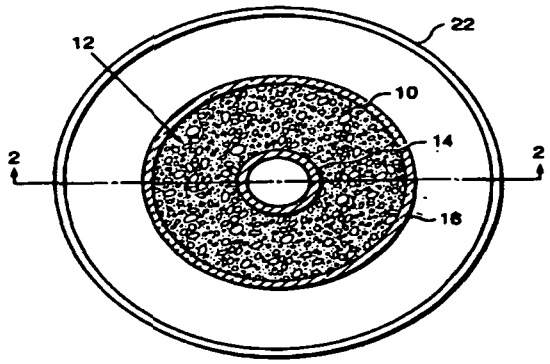

52
AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

N92-11621* National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.

RAPIDLY QUANTIFYING THE RELATIVE DISTENTION OF A HUMAN BLADDER Patent

JOHN A. COMPANION, inventor (to NASA), JOSEPH S. HEYMAN, inventor (to NASA), BETH A. MINEO, inventor (to NASA), ALBERT R. CAVALIER, inventor (to NASA), and TRAVIS N. BLALOCK, inventor (to NASA) 22 Oct. 1991 14 p Filed 26 May 1989 Continuation of US-Patent-Appl-SN-118993, filed 10 Nov. 1987 which is a continuation-in-part of abandoned US-Patent-Appl-SN-929869, filed 13 Nov. 1986 (NASA-CASE-LAR-13901-2; US-PATENT-5,058,591; US-PATENT-APPL-SN-358213; US-PATENT-APPL-SN-118993; US-PATENT-APPL-SN-929869; US-PATENT-CLASS-128-661.03; INT-PATENT-CLASS-A61B-8/00) Avail: US Patent and Trademark Office CSCL 06B

A device and method was developed to rapidly quantify the relative distention of the bladder of a human subject. An ultrasonic transducer is positioned on the human subject near the bladder. A microprocessor controlled pulser excites the transducer by sending an acoustic wave into the human subject. This wave interacts with the bladder walls and is reflected back to the ultrasonic transducer where it is received, amplified, and processed by the receiver. The resulting signal is digitized by an analog to digital converter, controlled by the microprocessor again, and is stored in data memory. The software in the microprocessor determines the relative distention of the bladder as a function of the propagated ultrasonic energy. Based on programmed scientific measurements and the human subject's past history as contained in program memory, the microprocessor sends out a signal to turn on any or all of the available alarms. The alarm system includes and audible alarm, the visible alarm, the tactile alarm, and the remote wireless alarm.

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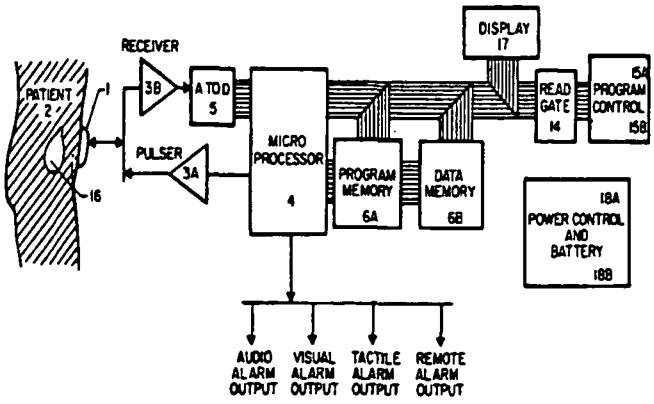


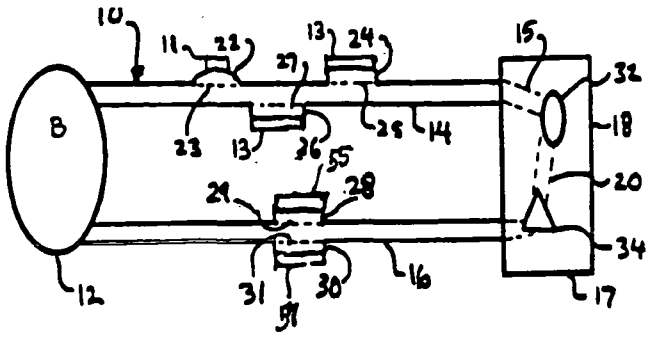
N92-11627*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

EXTRA-CORPOREAL BLOOD ACCESS, SENSING, AND RADIATION METHODS AND APPARATUSES Patent Application

KENT D. CASTLE, inventor (to NASA) 16 Sep. 1991 24 p (NASA-CASE-MSC-21775-1; NAS 1.71:MSC-21775-1; US-PATENT-APPL-SN-760633) Avail: NTIS HC/MF A03 CSCL 06B

The described invention is related to extra-corporeal blood access and radiation methods and apparatuses and, in particular, to subjecting flowing blood to energy in variety of forms, including radiation, electromagnetic force fields or atomic particles. It is directed to methods and apparatuses for accessing flowing blood and for subjecting the blood to electrical conductive, electrostatic or electromagnetic fields or for radiating the blood with some type of radiation, e.g., radio waves, ultrasonic or audio waves, microwaves, IR rays, visible light, UV radiation, x-rays, alpha, beta or gamma rays. An apparatus is employed which includes one or more access ports or windows for radiating blood and/or for sensing/analyzing blood. This invention is useful for killing viruses and bacteria in blood, monitoring blood for medical purposes, genetic modification of blood, and analyzing and/or treating blood components.

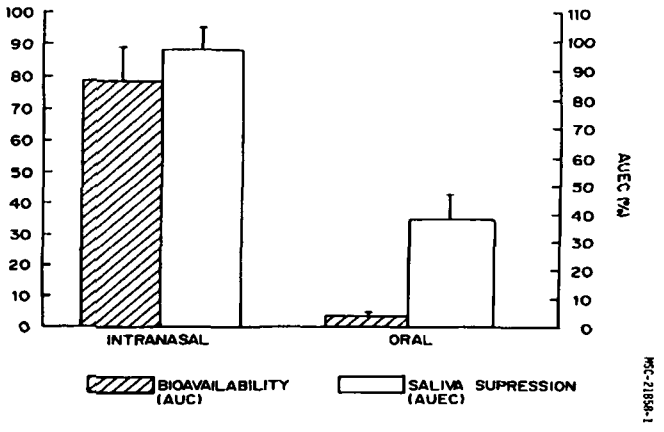
NASA



N92-11628*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
INTRANASAL SCOPOLAMINE PREPARATION AND METHOD Patent Application
LAKSHMI PUTCHA, inventor (to NASA) and NITZA M. CINTRON, inventor (to NASA0 25 Sep. 1991 11 p
(NASA-CASE-MSC-21858-1; NAS 1.71:MSC-21858-1; US-PATENT-APPL-SN-765615) Avail: NTIS HC/MF A03 CSCL 06E

A new method and preparation for intranasal delivery of scopolamine provides a safe and effective treatment for motion sickness and other conditions requiring anticholinergic therapy. The preparation can be in the form of aqueous nasal drops, mist spray, gel or ointment. Intranasal delivery of scopolamine has similar bioavailability and effect of intravenous delivery and is far superior to oral dosage. Scopolamine is prepared in a buffered saline solution at the desired dosage rate for effective anticholinergic response.

NASA



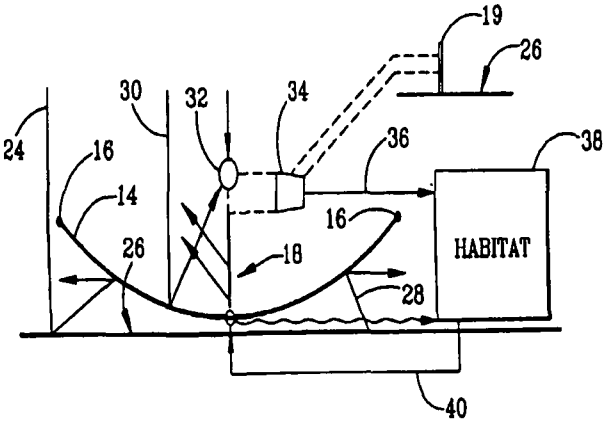
54
MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N92-11639*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
LUNAR RADIATOR SHADE Patent Application
MICHAEL K. EWERT, inventor (to NASA) 25 Sep. 1991 13 p
(NASA-CASE-MSC-21868-1; NAS 1.71:MSC-21868-1; US-PATENT-APPL-SN-765273) Avail: NTIS HC/MF A03 CSCL 06K

An apparatus for rejecting waste heat from a system located on or near the lunar equator which utilizes a reflective catenary shaped trough deployed about a vertical radiator to shade the radiator from heat (i.e., infrared radiation) emitted by the hot lunar surface. The catenary shaped trough is constructed from a film material and is aligned relative to the sun so that incoming solar energy is focused to a line just above the vertical radiator and thereby isolate the radiator from the effects of direct sunlight. The film is in a collapsed position between side by side support rods, all of which are in a transport case. To deploy the film and support rods, a set of parallel tracks running perpendicular to length of the support rods are extended out from the transport case. After the support tracks are deployed, the support rods are positioned equidistant from each other along the length of the support tracks so that the flexible film shade between adjacent support rods is unfolded and hangs in a catenary shaped trough. A heat radiator is supported between each pair of support rods above each hanging reflective trough.

NASA



N92-16559* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
END EFFECTOR WITH ASTRONAUT FOOT RESTRAINT Patent
LEO G. MONFORD, JR., inventor (to NASA) 10 Dec. 1991 9 p Filed 4 Mar. 1991
(NASA-CASE-MSC-21721-1; US-PATENT-5,070,964; US-PATENT-APPL-SN-664008; US-PATENT-CLASS-182-63; US-PATENT-CLASS-182-2; US-PATENT-CLASS-182-129; US-PATENT-CLASS-182-134; US-PATENT-CLASS-182-141; INT-PATENT-CLASS-B66F-11/04) Avail: US Patent and Trademark Office CSCL 06K

The combination of a foot restraint platform designed primarily for use by an astronaut being rigidly and permanently attached to an end effector which is suitable for attachment to the manipulator arm of a remote manipulating system is described. The foot restraint platform is attached by a brace to the end effector at a location away from the grappling interface of the end effector. The platform comprises a support plate provided with a pair of stirrups for receiving the toe portion of an astronaut's boots when standing on the platform and a pair of heel retainers in the form of raised members which are fixed to the surface of the platform and located to provide abutment surfaces for abutting engagement with the heels of the astronaut's boots when his toes are in the stirrups. The heel retainers preclude a backward sliding movement of the feet on the platform and instead require a lifting of the heels in order to extract the feet. The brace for attaching the foot restraint platform to the end effector may include a pivot or swivel joint to permit various orientations of the platform with respect to the end effector.

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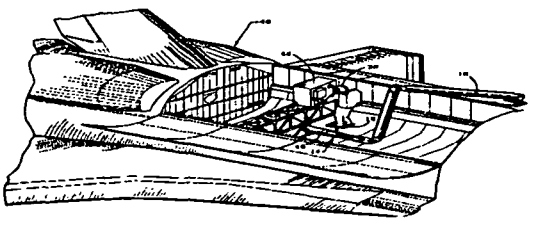
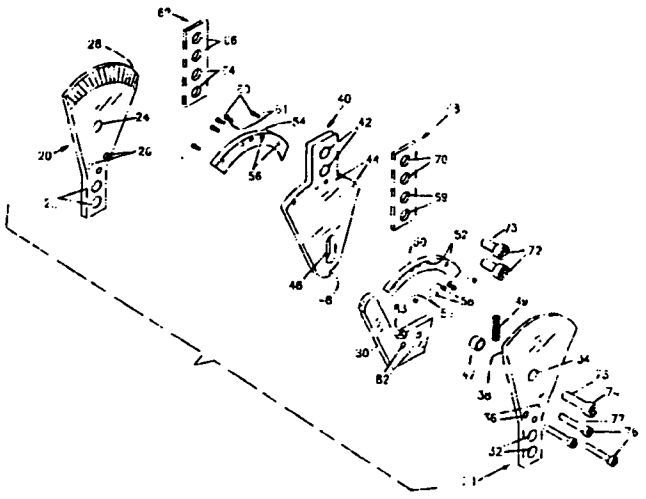


N92-17866*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
AUTOMATIC LOCKING ORTHOTIC KNEE DEVICE Patent Application
BRUCE WEDDENDORF, inventor (to NASA) 26 Dec. 1991 15 p
(NASA-CASE-MFS-28633-1; NAS 1.71:MFS-28633-1; US-PATENT-APPL-SN-813629) Avail: NTIS HC/MF A03 CSCL 05H

An articulated tang in clevis joint for incorporation in newly manufactured conventional strap-on orthotic knee devices or for replacing such joints in conventional strap-on orthotic knee devices is discussed. The instant tang in clevis joint allows the user the freedom to extend and bend the knee normally when no load (weight) is applied to the knee and to automatically lock the knee when the user transfers weight to the knee, thus preventing a damaged knee from bending uncontrollably when weight is applied to the knee. The tang in clevis joint of the present invention includes first and second clevis plates, a tang assembly and a spacer plate secured between the clevis plates. Each clevis plate includes a bevelled serrated upper section. A bevelled shoe is secured to the tank in close proximity to the bevelled serrated upper section of the clevis plates. A coiled spring mounted within an oblong bore of the tang normally urges the shoes secured to the tang out of engagement with the serrated upper section of each clevis plate to allow rotation of the tang relative to the clevis plate. When weight is applied to the joint, the load compresses the coiled spring, the serrations on each clevis plate dig into the bevelled shoes secured to the tang to prevent relative movement between the tang and clevis plates. A shoulder is provided on the tang and the spacer plate to prevent overextension of the joint.

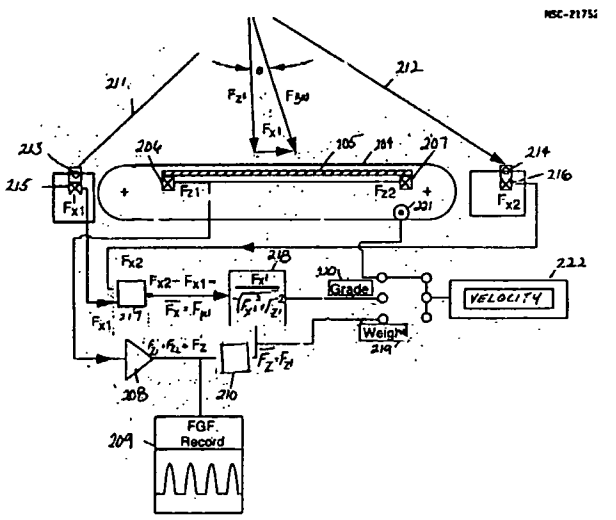
NASA



N92-17910*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
TREADMILL FOR SPACE FLIGHT Patent Application
WILLIAM E. THORNTON, inventor (to NASA) 15 Oct. 1991 35 p
(NASA-CASE-MSC-21752-1; NAS 1.71:MSC-21752-1; US-PATENT-APPL-SN-775404) Avail: NTIS HC/MF A03 CSCL 05H

Method and apparatus for accurately simulating locomotion in a weightless environment, especially to prevent atrophy of a subject's musculoskeletal and cardiorespiratory systems during space travel, are disclosed. Forces, including the vertical, horizontal, and lateral force generated by an individual during locomotion on a treadmill using a rigid belt with rigid transfer elements supported by low friction bogies, are measured by strain gauges sensitive in their respective direction. The vertical forces produced by securing the subject to the treadmill via bungee cords, in conjunction with the measured velocity of the treadmill and the mode of locomotion, are used to determine the subject's equivalent weight. The other horizontal and lateral forces are used to determine the external work produced by the subject when locomotion is performed on a nonlevel surface with an effective grade angle. The measured forces are related in such a way that the grade angle is easily determined. A motor and additional circuitry can be added to the apparatus to measure and force a subject to maintain a predetermined work rate associated with a preselected grade angle and tread velocity.

NASA



N92-21589* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
LUNAR RADIATOR SHADE Patent
MICHAEL K. EWERT, inventor (to NASA) 11 Feb. 1992 5 p Filed 25 Sep. 1991 Supersedes N92-11639 (30 - 2, p 292)
(NASA-CASE-MSC-21868-1; US-PATENT-5,086,828; US-PATENT-APPL-SN-765273; US-PATENT-CLASS-165-1; US-PATENT-CLASS-165-41; US-PATENT-CLASS-165-86; US-PATENT-CLASS-165-904; US-PATENT-CLASS-165-48.2; US-PATENT-CLASS-136-245; US-PATENT-CLASS-136-246) Avail: US Patent and Trademark Office CSCL 06K

An apparatus for rejecting waste heat from a system located on or near the lunar equator is presented. The system utilizes a reflective catenary shaped trough deployed about a vertical radiator to shade the radiator from heat emitted by the hot lunar surface. The catenary shaped trough is constructed from a film material and is aligned relative to the sun so that incoming solar energy is focused to a line just above the vertical radiator and can thereby isolate the radiator from the effects of direct sunlight. The film is in a collapsed position between side by side support rods, all of which are in a transport case. To deploy the film and support rods, a set of parallel tracks running perpendicular to length of the support rods are extended out from the transport case. After the support tracks are deployed, the support rods are positioned equidistant from each other along the length of the support tracks so that the flexible film shade between adjacent support rods is unfolded and hangs in a catenary shaped trough.

A heat radiator is supported between each pair of support rods above each hanging reflective trough.

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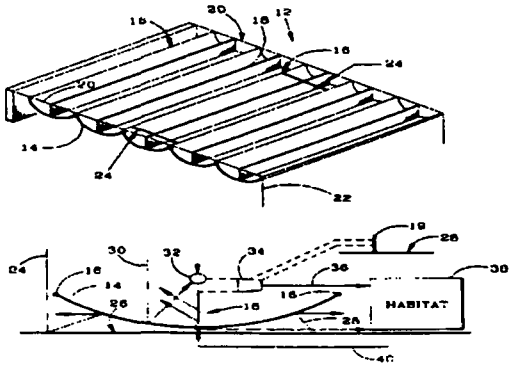


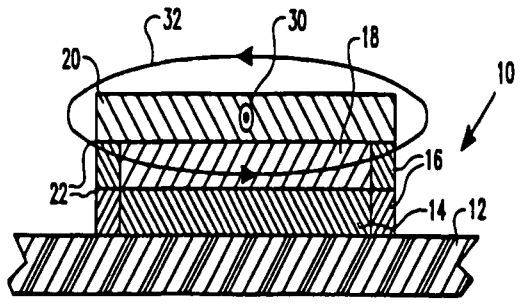
60
COMPUTER OPERATIONS AND HARDWARE

Includes hardware for computer graphics, firmware, and data processing.

N92-12438*# National Aeronautics and Space Administration. Pasadena Office, CA.
INTEGRATED, NON-VOLATILE, HIGH-SPEED ANALOG RANDOM ACCESS MEMORY Patent Application
ROMNEY R. KATTI, inventor (to NASA), JIIN-CHUAN WU, inventor (to NASA), and HENRY L. STADLER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 11 Feb. 1991 19 p
(Contract NAS7-918)
(NASA-CASE-NPO-17998-1-CU; NAS 1.71:NPO-17998-1-CU; US-PATENT-APPL-SN-653578) Avail: NTIS HC/MF A03 CSCL 09B

An invention that provides an integrated, nonvolatile, high speed random access memory is discussed. A magnetically switchable ferromagnetic or ferrimagnetic layer is sandwiched between and electrical conductor which provides the ability to magnetize the magnetically switchable layer and a magnetoresistive or Hall effect material which allows sensing the magnetic field which emanates from the magnetization of the magnetically switchable layer. By using this integrated three layer form, the writing process, which is controlled by the conductor, is separated from the storage medium in the magnetic layer and from the readback process which is controlled by magnetoresistive layer. A circuit for implementing the memory in CMOS or the like is disclosed.

NASA



N92-16563* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
PROGRAMMABLE REMAPPER FOR IMAGE PROCESSING Patent
RICHARD D. JUDAY, inventor (to NASA) and JEFFREY B. SAMPSELL, inventor (to NASA) 19 Nov. 1991 22 p Filed 31 Mar. 1989 Supersedes N91-23724 (29 - 15, p 2480)
(NASA-CASE-MSC-21350-1; US-PATENT-5,067,019; US-PATENT-APPL-SN-331551; US-PATENT-CLASS-358-160; US-PATENT-CLASS-358-22; US-PATENT-CLASS-358-183; INT-PATENT-CLASS-H04N-5/262) Avail: US Patent and Trademark Office CSCL 09B

A video-rate coordinate remapper includes a memory for storing a plurality of transformations on look-up tables for remapping input images from one coordinate system to another. Such transformations are operator selectable. The remapper includes a collective processor by which certain input pixels of an input image are transformed to a portion of the output image in a many-to-one relationship. The remapper includes an interpolative processor by which the remaining input pixels of the input image are transformed to another portion of the output image in a one-to-many relationship. The invention includes certain specific transforms for creating output images useful for certain defects of visually impaired people. The invention also includes means for shifting input pixels and means for scrolling the output matrix.

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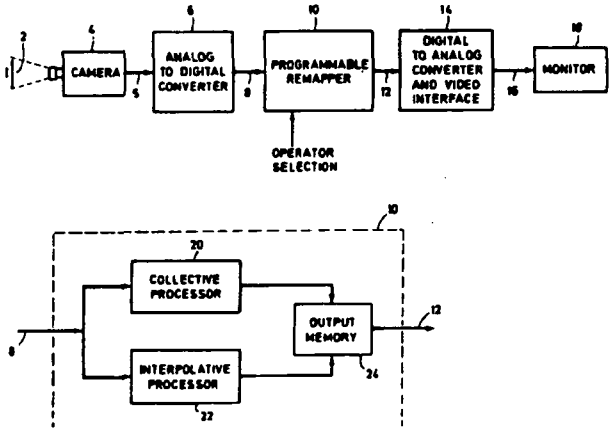
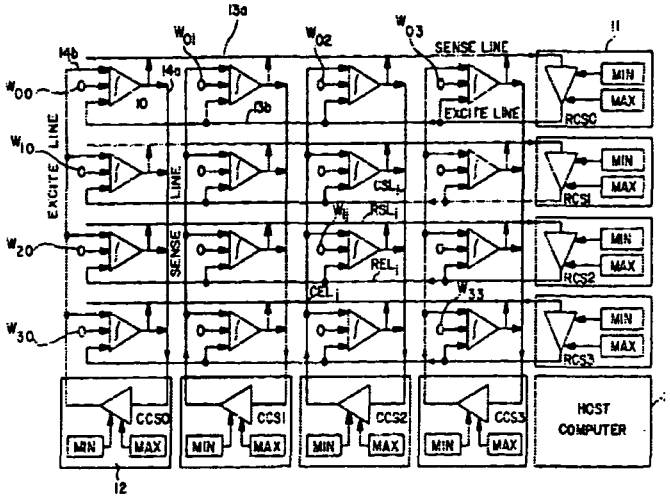


N92-17884*# National Aeronautics and Space Administration. Pasadena Office, CA.
NEURAL-NETWORK DEDICATED PROCESSOR FOR SOLVING COMPETITIVE ASSIGNMENT PROBLEMS Patent Application
SILVIO P. EBERHARDT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Aug. 1991 38 p
(Contract NAS7-918)
(NASA-CASE-NPO-17781-1-CU; NAS 1.71:NPO-17781-1-CU; US-PATENT-APPL-SN-744042) Avail: NTIS HC/MF A03 CSCL 09B

A neural-network processor for solving first-order competitive assignment problems consists of a matrix of NxM processing units, each of which corresponds to the pairing of a first number of elements of (R sub i) with a second number of elements (C sub j), wherein limits of the first number are programmed in row control superneurons, and limits of the second number are programmed in column superneurons as MIN and MAX values. The cost (weight) W sub ij of the pairings is programmed separately into each PU. For each row and column of PUs, a dedicated constraint superneuron insures that the number

of active neurons within the associated row or column fall within a specified range. Annealing is provided by gradually increasing the PU gain for each row and column or increasing positive feedback to each PU, the latter being effective to increase hysteresis of each PU or by combining both of these techniques.

NASA



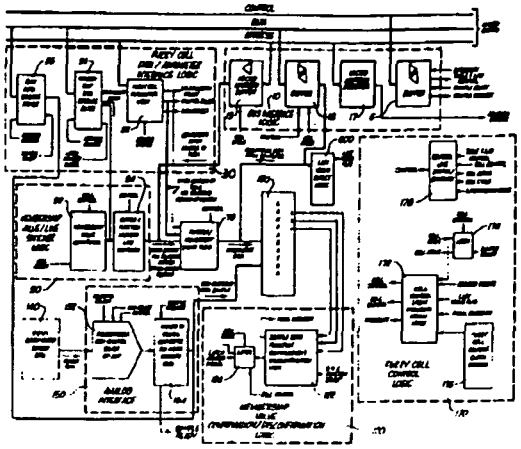
61
COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms, and specific applications, e.g., CAD/CAM.

N92-10331*# National Aeronautics and Space Administration. *Lyndon B. Johnson Space Center, Houston, TX.*
RECONFIGURABLE FUZZY CELL Patent Application
GEORGE A. SALAZAR, inventor (to NASA) 18 Sep. 1991 70 p
(NASA-CASE-MSC-21613-1; NAS 1.71:MSC-21613-1; US-PATENT-APPL-SN-761566) Avail: NTIS HC/MF A04 CSCL 09B

This invention relates to a reconfigurable fuzzy cell comprising a digital control programmable gain operation amplifier, an analog-to-digital converter, an electrically erasable PROM, and 8-bit counter and comparator, and supporting logic configured to achieve in real-time fuzzy systems high throughput, grade-of-membership or membership-value conversion of multi-input sensor data. The invention provides a flexible multiplexing-capable configuration, implemented entirely in hardware, for effectuating S-, Z-, and PI-membership functions or combinations thereof, based upon fuzzy logic level-set theory. A membership value table storing 'knowledge data' for each of S-, Z-, and PI-functions is contained within a nonvolatile memory for storing bits of membership and parametric information in a plurality of address spaces. Based upon parametric and control signals, analog sensor data is digitized and converted into grade-of-membership data. In situ learn and recognition modes of operation are also provided.

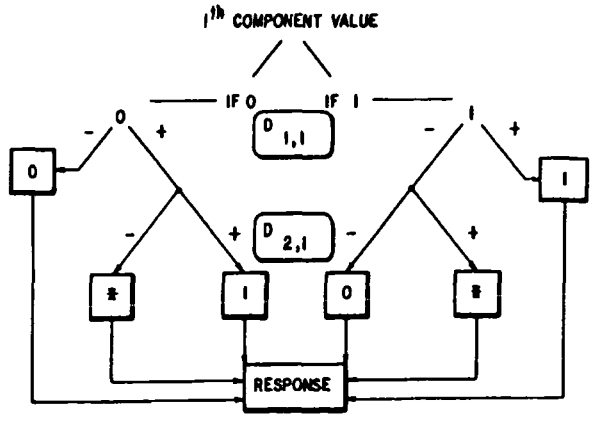
NASA



N92-17860*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
DYNAMIC PATTERN MATCHER USING INCOMPLETE DATA Patent Application
GORDON G. JOHNSON, inventor (to NASA) (Barrios Technology, Inc., Houston, TX.) and IUI WANG, inventor (to NASA) 26 Aug. 1991 47 p
(NASA-CASE-MSC-21415-1-SB; NAS 1.71:MSC-21415-1-SB; US-PATENT-APPL-SN-749819) Avail: NTIS HC/MF A03 CSCL 09B

This invention relates generally to pattern matching systems, and more particularly to a method for dynamically adapting the system to enhance the effectiveness of a pattern match. Apparatus and methods for calculating the similarity between patterns are known. There is considerable interest, however, in the storage and retrieval of data, particularly, when the search is called or initiated by incomplete information. For many search algorithms, a query initiating a data search requires exact information, and the data file is searched for an exact match. Inability to find an exact match thus results in a failure of the system or method.

NASA

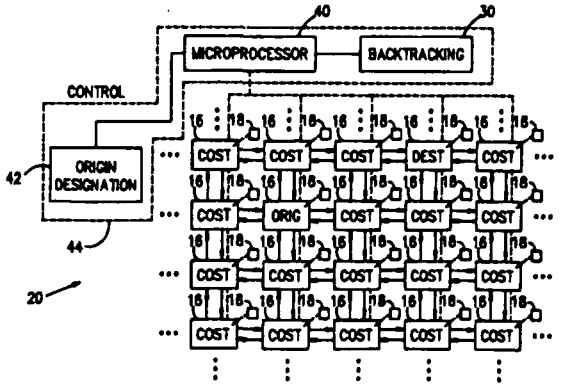


62
COMPUTER SYSTEMS

Includes computer networks and special application computer systems.

N92-15620*# National Aeronautics and Space Administration. Pasadena Office, CA.
NETWORK OF DEDICATED PROCESSORS FOR FINDING LOWEST-COST MAP PATH Patent
SILVIO P. EBERHARDT, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Dec. 1991 9 p
Filed 26 May 1989 Supersedes N90-10608 (28 - 1, p 107)
(NASA-CASE-NPO-17716-1-CU; US-PATENT-5,072,379; US-PATENT-APPL-SN-357759; US-PATENT-CLASS-364-402; INT-PATENT-CLASS-G06F-15/20; INT-PATENT-CLASS-G06G-7/48) Avail: US Patent and Trademark Office CSCL 09B

A method and associated apparatus are disclosed for finding the lowest cost path of several variable paths. The paths are comprised of a plurality of linked cost-incurring areas existing between an origin point and a destination point. The method comprises the steps of connecting a plurality of nodes together in the manner of the cost-incurring areas; programming each node to have a cost associated therewith corresponding to one of the cost-incurring areas; injecting a signal into one of the nodes representing the origin point; propagating the signal through the plurality of nodes from inputs to outputs; reducing the signal in magnitude at each node as a function of the respective cost of the node; and, starting at one of the nodes representing the destination point and following a path having the least reduction in magnitude of the signal from node to node back to one of the nodes representing the origin point whereby the lowest cost path from the origin point to the destination point is found.
Official Gazette of the U.S. Patent and Trademark Office



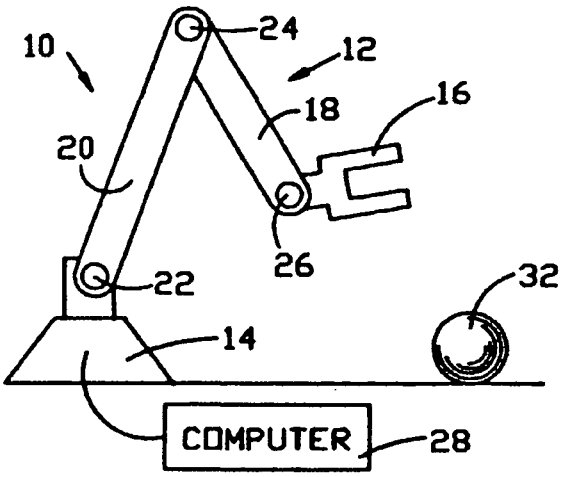
63
CYBERNETICS

Includes feedback and control theory, artificial intelligence, robotics and expert systems.

N92-17895*# National Aeronautics and Space Administration. Pasadena Office, CA.
HIGH LEVEL LANGUAGE-BASED ROBOTIC CONTROL SYSTEM Patent Application
GUILLERMO RODRIGUEZ, inventor (to NASA), KENNETH K. KRUETZ, inventor (to NASA), and ABHINANDAN JAIN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 1 Nov. 1991 56 p
(Contract NAS7-918)
(NASA-CASE-NPO-17918-2-CU; NAS 1.71:NPO-17918-2-CU; US-PATENT-APPL-SN-786499) Avail: NTIS HC/MF A04 CSCL 09B

This invention is a robot control system based on a high level language implementing a spatial operator algebra. There are two high level languages included within the system. At the highest level, applications programs can be written in a robot-oriented applications language including broad operators such as MOVE and GRASP. The robot-oriented applications language statements are translated into statements in the spatial operator algebra language. Programming can also take place using the spatial operator algebra language. The statements in the spatial operator algebra language from either source are then translated into machine language statements for execution by a digital control computer. The system also includes the capability of executing the control code sequences in a simulation mode before actual execution to assure proper action at execution time. The robot's environment is checked as part of the process and dynamic reconfiguration is also possible. The languages and system allow the programming and control of multiple arms and the use of inward/outward spatial recursions in which every computational step can be related to a transformation from one point in the mechanical robot to another point to name two major advantages.

NASA



71
ACOUSTICS

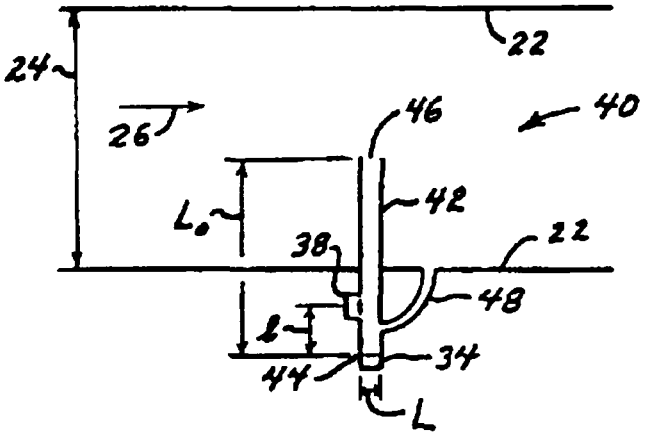
Includes sound generation, transmission, and attenuation.

N92-10609*# National Aeronautics and Space Administration. Pasadena Office, CA.
ACOUSTIC DEVICE AND METHOD FOR MEASURING GAS DENSITIES Patent Application
PARTHASARATHY SHAKKOTTAI, inventor (to NASA), EUG Y. KWACK, inventor (to NASA), and LLOYD BACK, inventor (to

NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 19 Feb. 1991 35 p
(Contract NAS7-918)
(NASA-CASE-NPO-18155-1-CU; NAS 1.71:NPO-18155-1-CU; US-PATENT-APPL-SN-658477) Avail: NTIS HC/MF A03 CSCL 20A

Density measurements can be made in a gas contained in a flow through enclosure by measuring the sound pressure level at a receiver or microphone located near a dipole sound source which is driven at constant velocity amplitude at low frequencies. Analytical results, which are provided in terms of geometrical parameters, wave numbers, and sound source type for systems of this invention, agree well with published data. The relatively simple designs feature a transmitter transducer at the closed end of a small tube and a receiver transducer on the circumference of the small tube located a small distance away from the transmitter. The transmitter should be a dipole operated at low frequency with the kL value preferable less that about 0.3.

NASA



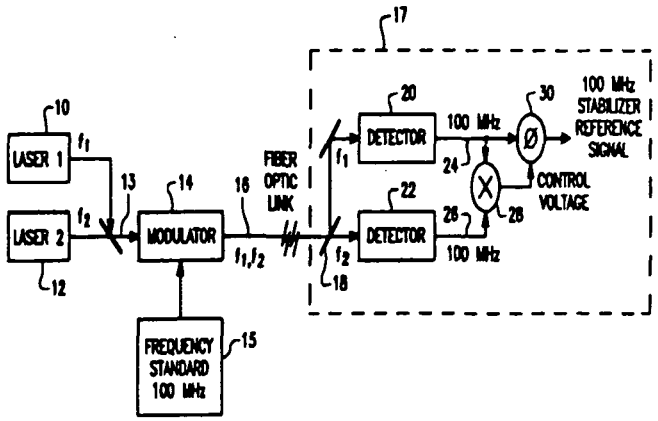
74
OPTICS

Includes light phenomena; and optical devices.

N92-11791*# National Aeronautics and Space Administration. Pasadena Office, CA.
DUAL FREQUENCY OPTICAL CARRIER TECHNIQUE FOR TRANSMISSION OF REFERENCE FREQUENCIES IN DISPERSIVE MEDIA Patent Application
LUTFOLLAH MALEKI, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 20 May 1991 14 p
(Contract NAS7-918)
(NASA-CASE-NPO-18007-1-CU; NAS 1.71:NPO-18007-1-CU; US-PATENT-APPL-SN-703238) Avail: NTIS HC/MF A03 CSCL 20F

This invention relates to stabilized frequency distribution links, suitable for guided wave and free space applications, and immune to degradations resulting from the variations of the dispersive properties of the propagation medium. In this system two different carrier frequencies modulated by a reference frequency are transmitted to each receiver in order to be synchronized. Each receiver is constructed to respond to local phase differences between the two received signals and to correct the phase of one them (the signals) so as to maintain the corrected signal as a reliable synchronization reference.

NASA



N92-16808* National Aeronautics and Space Administration. Pasadena Office, CA.
ALL-OPTICAL PHOTOCHROMIC SPATIAL LIGHT MODULATORS BASED ON PHOTOINDUCED ELECTRON TRANSFER IN RIGID MATRICES Patent
DAVID N. BERATAN, inventor (to NASA) and JOSEPH W. PERRY, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 5 Nov. 1991 12 p Filed 15 Feb. 1990 Supersedes N90-27487 (28 - 21, p 3076)
(NASA-CASE-NPO-17612-1-CU; US-PATENT-5,062,693; US-PATENT-APPL-SN-480385; US-PATENT-CLASS-359-241; US-PATENT-CLASS-359-240; US-PATENT-CLASS-359-11; INT-PATENT-CLASS-G02B-5/23; INT-PATENT-CLASS-G02B-1/01; INT-PATENT-CLASS-G02B-1/12) Avail: US Patent and Trademark Office CSCL 20F

A single material (not a multi-element structure) spatial light modulator may be written to, as well as read out from, using light. The device has tailorable rise and hold times dependent on the composition and concentration of the molecular species used as the active components. The spatial resolution of this device is limited only by light diffraction as in volume holograms. The device may function as a two-dimensional mask (transmission or reflection) or as a three-dimensional volume holographic medium. This device, based on optically-induced electron transfer, is able to perform incoherent to coherent image conversion or wavelength conversion over a wide spectral range (ultraviolet, visible, or near-infrared regions).

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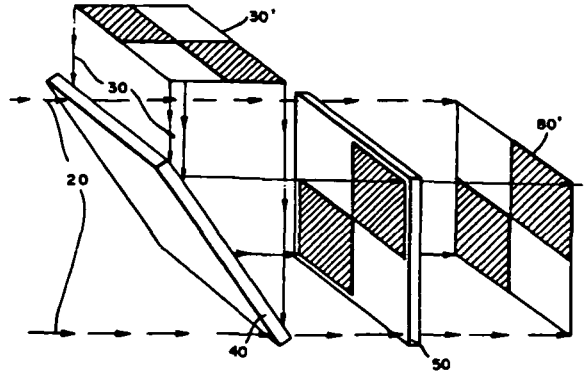
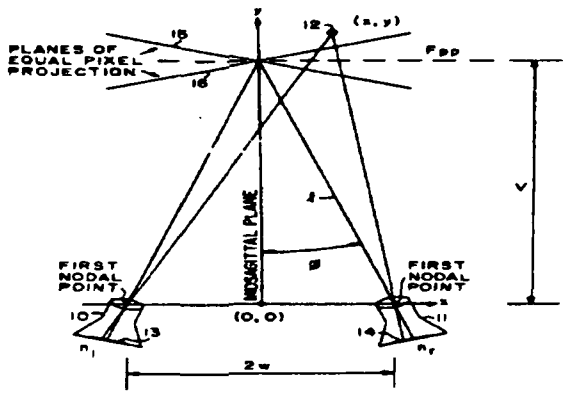


N92-16809* National Aeronautics and Space Administration. Pasadena Office, CA.
STEREOSCOPIC CAMERA AND VIEWING SYSTEMS WITH UNDISTORTED DEPTH PRESENTATION AND REDUCED OR ELIMINATED ERRONEOUS ACCELERATION AND DECELERATION PERCEPTIONS, OR WITH PERCEPTIONS PRODUCED OR ENHANCED FOR SPECIAL EFFECTS Patent
DANIEL B. DINER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 12 Nov. 1991 22 p Filed 2 Nov. 1990 Supersedes N91-24878 (29 - 16, p 2688)
(NASA-CASE-NPO-18028-1-CU; US-PATENT-5,065,236; US-PATENT-APPL-SN-608452; US-PATENT-CLASS-358-88; US-PATENT-CLASS-358-91; US-PATENT-CLASS-358-92; INT-PATENT-CLASS-H04N-13/00) Avail: US Patent and Trademark Office CSCL 20F

Methods for providing stereoscopic image presentation and stereoscopic configurations using stereoscopic viewing systems having converged or parallel cameras may be set up to reduce or eliminate erroneously perceived accelerations and decelerations by proper selection of parameters, such as an image magnification factor, q, and intercamera distance, 2w. For converged cameras, q is selected to be equal to Ve - qwl = 0, where V is the camera distance, e is half the interocular distance of an observer, w is half the intercamera distance, and l is the actual distance from the first nodal point of each camera to the convergence point, and for parallel cameras, q is selected to be equal to e/w. While converged cameras cannot be set up to provide fully undistorted three-dimensional views, they can be set up to provide a linear relationship between real and apparent depth and thus minimize erroneously perceived accelerations and decelerations for three sagittal planes, x = -w, x = 0, and x = +w which are indicated to the observer. Parallel cameras can be set up to provide fully undistorted three-dimensional views by controlling the location of the observer and by magnification and shifting of left and right images. In addition, the teachings of this disclosure can be used to provide methods of stereoscopic image presentation and stereoscopic camera configurations to produce a nonlinear relation between perceived and real depth, and erroneously produce or enhance perceived accelerations and decelerations in order to provide special effects for entertainment, training, or educational purposes.

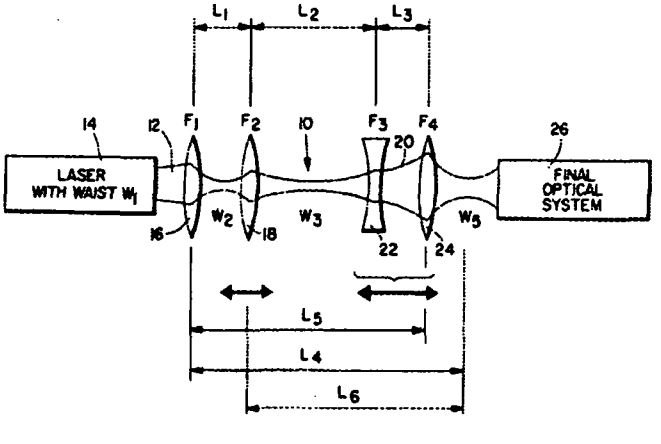
Official Gazette of the U.S. Patent and Trademark Office



N92-16810* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
MATCHING OPTICS FOR GAUSSIAN BEAMS Patent
WILLIAM D. GUNTER, inventor (to NASA) 20 Aug. 1991 5 p Filed 31 Jan. 1990
(NASA-CASE-ARC-11892-1-SB; US-PATENT-5,040,886; US-PATENT-APPL-SN-472939; US-PATENT-CLASS-359-572; US-PATENT-CLASS-359-362; US-PATENT-CLASS-359-744; INT-PATENT-CLASS-G02B-23/00; INT-PATENT-CLASS-G02B-3/00) Avail: US Patent and Trademark Office CSCL 20F

A system of matching optics for Gaussian beams is described. The matching optics system is positioned between a light beam emitter (such as a laser) and the input optics of a second optics system whereby the output from the light beam emitter is converted into an optimum input for the succeeding parts of the second optical system. The matching optics arrangement includes the combination of a light beam emitter, such as a laser with a movable afocal lens pair (telescope) and a single movable lens placed in the laser's output beam. The single movable lens serves as an input to the telescope. If desired, a second lens, which may be fixed, is positioned in the beam before the adjustable lens to serve as an input processor to the movable lens. The system provides the ability to choose waist diameter and position independently and achieve the desired values with two simple adjustments not requiring iteration.

Official Gazette of the U.S. Patent and Trademark Office



N92-16811* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
APPARATUS FOR PRECISION FOCUSSING AND POSITIONING OF A BEAM WAIST ON A TARGET Patent
DANA H. LYNCH, inventor (to NASA), WILLIAM D. GUNTER, inventor (to NASA), and KENNETH W. MCALISTER, inventor (to NASA) 31 Dec. 1991 10 p Filed 31 May 1990 Supersedes N91-14002 (29 - 5, p 717)
(NASA-CASE-ARC-11916-1-SB; US-PATENT-5,077,622; US-PATENT-APPL-SN-531373; US-PATENT-CLASS-359-813; US-PATENT-CLASS-359-557; US-PATENT-CLASS-359-819; INT-PATENT-CLASS-G02B-7/02; INT-PATENT-CLASS-G02B-27/64) Avail: US Patent and Trademark Office CSCL 20F

The invention relates to optical focussing apparatus and, more particularly, to optical apparatus for focussing a highly collimated Gaussian beam which provides independent and fine control over the focus waist diameter, the focus position both along the beam axis and transverse to the beam, and the focus angle. A beam focussing and positioning apparatus provides focussing and positioning for the waist of a waisted beam at a desired location on a target such as an optical fiber. The apparatus includes a first lens, having a focal plane f sub 1, disposed in the path of an incoming beam and a second lens, having a focal plane f sub 2 and being spaced downstream from the first lens

by a distance at least equal to f sub 1 + 10 f sub 2, which cooperates with the first lens to focus the waist of the beam on the target. A rotatable optical device, disposed upstream of the first lens, adjusts the angular orientation of the beam waist. The transverse position of the first lens relative to the axis of the beam is varied to control the transverse position of the beam waist relative to the target (a fiber optic as shown) while the relative axial positions of the lenses are varied to control the diameter of the beam waist and to control the axial position of the beam waist. Mechanical controllers C sub 1, C sub 2, C sub 3, C sub 4, and C sub 5 control the elements of the optical system. How seven adjustments can be made to correctly couple a laser beam into an optical fiber is illustrated. Prior art systems employing optical techniques to couple a laser beam into an optical fiber or other target simply do not provide the seven necessary adjustments. The closest known prior art, a Newport coupler, provides only two of the seven required adjustments.

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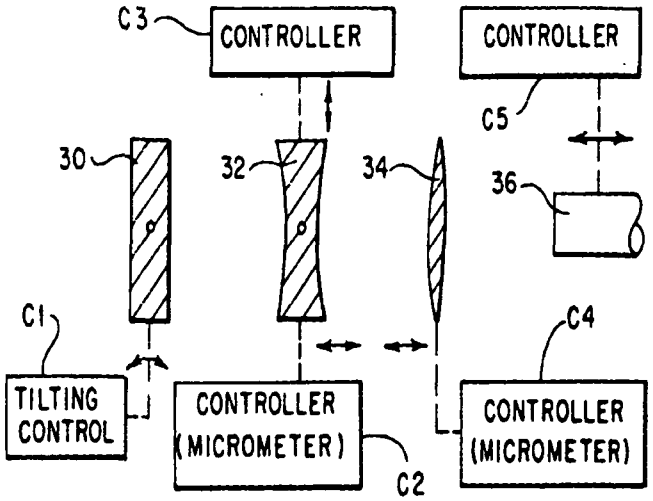


N92-17675*# National Aeronautics and Space Administration. Pasadena Office, CA.

REAL-TIME EDGE-ENHANCED OPTICAL CORRELATOR Patent Application

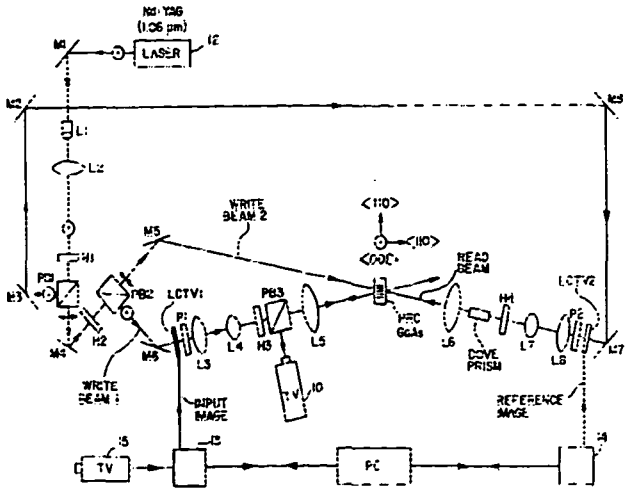
TSUEN-HSI LIU, inventor (to NASA) and LI-JEN CHENG, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 25 Nov. 1991 26 p

(Contract NAS7-918)

(NASA-CASE-NPO-18379-1-CU; NAS 1.71:NPO-18379-1-CU; US-PATENT-APPL-SN-797569) Avail: NTIS HC/MF A03 CSCL 20F

Edge enhancement of an input image by four-wave mixing a first write beam with a second write beam in a photorefractive crystal, GaAs, achieved for VanderLugt optical correlation with an edge enhanced reference image by optimizing the power ratio of a second write beam to the first write beam (70:1) and optimizing the power ratio of a read beam, which carries the reference image to the first write beam (100:701). Liquid crystal TV panels are employed as spatial light modulators to change the input and reference images in real time.

NASA



N92-17863*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.

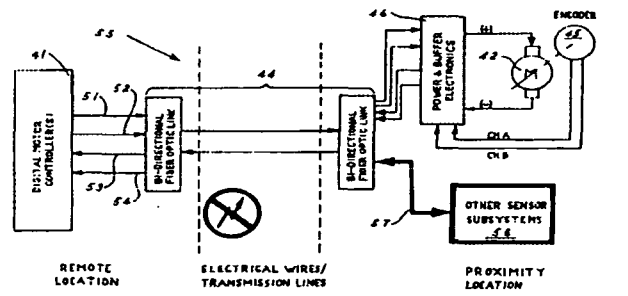
CLOSED-LOOP MOTOR CONTROL USING HIGH-SPEED FIBER OPTICS Patent Application

REGINALD DAWSON, inventor (to NASA) and DAGOBERT RODRIQUIZ, inventor (to NASA) (Lockheed Engineering and Sciences Co., Houston, TX.) 22 Oct. 1991 26 p

(NASA-CASE-MSC-21806-1; NAS 1.71:MSC-21806-1; US-PATENT-APPL-SN-780513) Avail: NTIS HC/MF A03 CSCL 20F

A closed-loop control system for controlling the operation of one or more servo motors or other controllable devices is described. The system employs a fiber optics link immune to electromagnetic interference, for transmission of control signals from a controller or controllers at a remote station to the power electronics located in proximity to the motors or other devices at the local station. At the remote station the electrical control signals are time-multiplexed, converted to a formatted serial bit stream, and converted to light signals for transmission over a single fiber of the fiber optics link. At the local station, the received optical signals are reconstructed as electrical control signals for the controlled motors or other devices. At the local station, an encoder sensor linked to the driven device generates encoded feedback signals which provide information as to a condition of the controlled device. The encoded signals are placed in a formatted serial bit stream, multiplexed, and transmitted as optical signals over a second fiber of the fiber optic link which closes the control loop of the closed-loop motor controller. The encoded optical signals received at the remote station are demultiplexed, reconstructed and coupled to the controller(s) as electrical feedback signals.

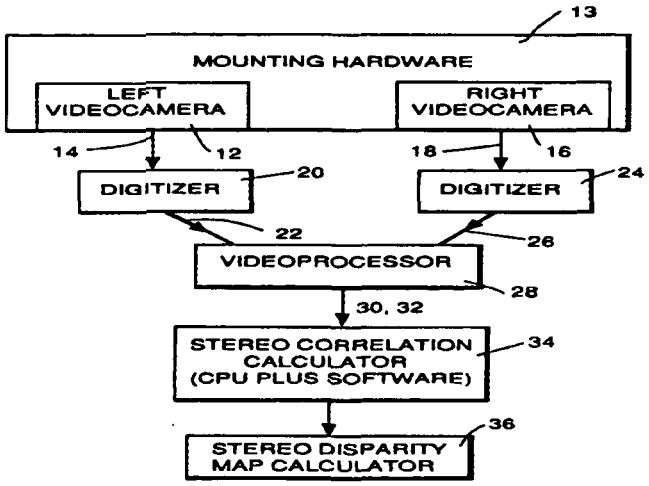
NASA



N92-17864*# National Aeronautics and Space Administration. Pasadena Office, CA.
NEAR REAL-TIME STEREO VISION SYSTEM Patent Application
LARRY H. MATTHIES, inventor (to NASA) and CHARLES H. ANDERSON, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 18 Dec. 1991 55 p
(Contract NAS7-918)
(NASA-CASE-NPO-18593-1-CU; NAS 1.71:NPO-18593-1-CU; US-PATENT-APPL-SN-812901) Avail: NTIS HC/MF A04 CSCL 20F

The apparatus for a near real-time stereo vision system for use with a robotic vehicle is described. The system is comprised of two cameras mounted on three-axis rotation platforms, image-processing boards, a CPU, and specialized stereo vision algorithms. Bandpass-filtered image pyramids are computed, stereo matching is performed by least-squares correlation, and confidence ranges are estimated by means of Bayes' theorem. In particular, Laplacian image pyramids are built and disparity maps are produced from the 60 x 64 level of the pyramids at rates of up to 2 seconds per image pair. The first autonomous cross-country robotic traverses (of up to 100 meters) have been achieved using the stereo vision system of the present invention with all computing done onboard the vehicle. The overall approach disclosed herein provides a unifying paradigm for practical domain-independent stereo ranging.

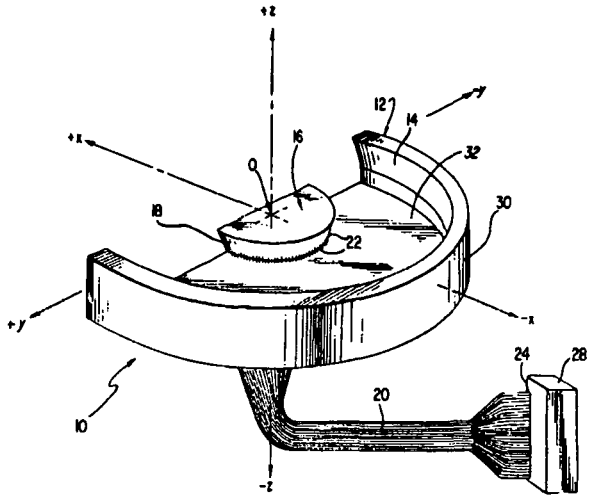
NASA



N92-17892*# National Aeronautics and Space Administration. Pasadena Office, CA.
WIDE FIELD STRIP-IMAGING OPTICAL SYSTEM Patent Application
ARTHUR H. VAUGHAN, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 1 Nov. 1991 37 p
(Contract NAS7-918)
(NASA-CASE-NPO-18146-1-CU; NAS 1.71:NPO-18146-1-CU; US-PATENT-APPL-SN-786618) Avail: NTIS HC/MF A03 CSCL 20F

A strip imaging wide angle optical system is provided. The optical system is provided with a 'virtual' material stop to avoid aberrational effects inherent in wide angle optical systems. The optical system includes a spherical mirror section for receiving light from a 180 deg strip or arc of a target image. Light received by the spherical mirror section is reflected to a frustoconical mirror section for subsequent rereflection to a row of optical fibers. Each optical fiber transmits a portion of the received light to a detector. The optical system exploits the narrow cone of acceptance associated with optical fibers to substantially eliminate vignetting effects inherent in wide angle systems. Further, the optical system exploits the narrow cone of acceptance of the optical fibers to substantially limit spherical aberration. The optical system is ideally suited for any application wherein a 180 deg strip image need be detected, and is particularly well adapted for use in hostile environments such as in planetary exploration.

NASA



N92-22034* National Aeronautics and Space Administration. Pasadena Office, CA.
EQUAL PATH, PHASE SHIFTING, SAMPLE POINT INTERFEROMETER FOR MONITORING THE CONFIGURATION OF SURFACES Patent
PAUL K. MANHART, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 14 Jan. 1992 9 p Filed 23 May 1990 Supersedes N90-27488 (28 - 21, p 3076)
(NASA-CASE-NPO-17913-1-CU; US-PATENT-5,080,490; US-PATENT-APPL-SN-527509; US-PATENT-CLASS-356-351; US-PATENT-CLASS-356-360; US-PATENT-CLASS-356-363; INT-PATENT-CLASS-G01B-9/02) Avail: US Patent and Trademark Office CSCL 20F

A system for monitoring the configuration of a surface (e.g., a segmented parabolic surface) using orthogonally placed retroreflectors at sets of points 1, 2, and 3 dispersed throughout the surface with a stationary halfwave plate (HWP) in the front of the one retroreflector at a corner point 3 and a rotating halfwave plate (RHWP) over a source of linearly polarized coherent light, thereby causing the direction of linear polarization to continuously rotate through 360 deg and causing light returned by the retroreflector at point 3 to be continuously phase shifted through 360 deg relative to light returned by retroreflectors at points 1 and 2. The returned light from each set of points 1, 2, and 3 is focused onto a bed-of-nails (BON) phase grating diagonally oriented with respect to the orthogonal orientation of the incident beams from retroreflectors 1, 2, and 3, thereby causing overlap in the light from points 1 and 3 to produce interferometric signals 1,3 and 2,3. Any change in phase of the interferometric signals 1,3 and 2,3 indicates both the magnitude and direction of any change in the position of the retroreflector at point 3 relative to

retroreflectors at points 1 and 2.

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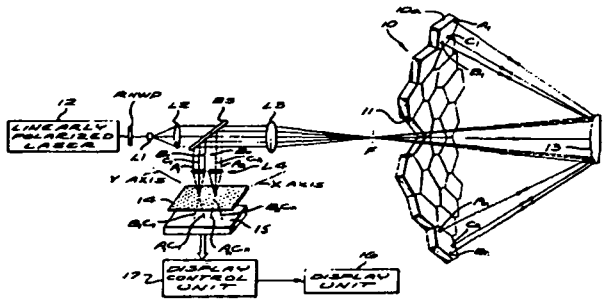

76
SOLID-STATE PHYSICS

Includes superconductivity.

N92-10681* National Aeronautics and Space Administration. Pasadena Office, CA.
PASSIVATION OF HIGH TEMPERATURE SUPERCONDUCTORS Patent
RICHARD P. VASQUEZ, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 22 Oct. 1991 10 p Filed 28 Jun. 1990 Supersedes N90-26684 (28 - 20, p 2932)
(NASA-CASE-NPO-17949-1-CU; US-PATENT-5,059,581; US-PATENT-APPL-SN-545016; US-PATENT-CLASS-505-1; US-PATENT-CLASS-505-728; US-PATENT-CLASS-427-62; US-PATENT-CLASS-427-343; US-PATENT-CLASS-156-637; INT-PATENT-CLASS-B05D-5/12; INT-PATENT-CLASS-C23F-1/00) Avail: US Patent and Trademark Office CSCL 20L

The surface of high temperature superconductors such as YBa2Cu3O(7-x) are passivated by reacting the native Y, Ba and Cu metal ions with an anion such as sulfate or oxalate to form a surface film that is impervious to water and has a solubility in water of no more than 10(exp -3) M. The passivating treatment is preferably conducted by immersing the surface in dilute aqueous acid solution since more soluble species dissolve into the solution. The treatment does not degrade the superconducting properties of the bulk material.

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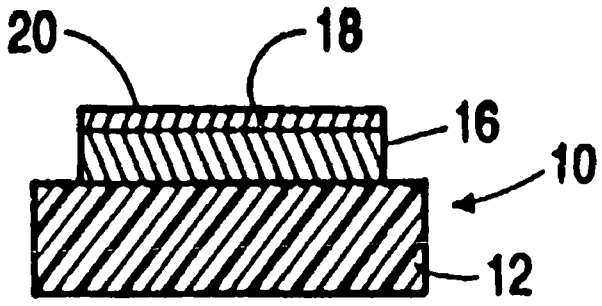

N92-21499* National Aeronautics and Space Administration. Pasadena Office, CA.
DEVICE FOR MECHANICALLY STABILIZING WEB RIBBON BUTTONS DURING GROWTH INITIATION Patent
PAUL K. HENRY, inventor (to NASA) and EDWARD P. FORTIER, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 3 Mar. 1992 5 p Filed 10 Feb. 1989 Continuation of abandoned US-Patent-Appl-SN-102934, filed 30 Sep. 1987
(NASA-CASE-NPO-17074-2-CU; US-PATENT-5,092,956; US-PATENT-APPL-SN-311376; US-PATENT-APPL-SN-102934; US-PATENT-CLASS-156-617.1; US-PATENT-CLASS-156-608; US-PATENT-CLASS-156-620.1; US-PATENT-CLASS-156-620.3; US-PATENT-CLASS-156-620.4; US-PATENT-CLASS-156-DIG.64) Avail: US Patent and Trademark Office CSCL 20L

The invention relates to a stabilization device for stabilizing dendritic web seed buttons during initiation of crystal growth from a float melt zone. The invention includes angular maintenance means for maintaining a constant angular orientation between the axis of a growth initiation seed and the upper surface of a web button during withdrawal of the web button from the melt. In the preferred embodiment, the angular means includes an adjustable elevation tube which surrounds the seed, the weight of which may be selectively supported by the seed button during web button withdrawal.

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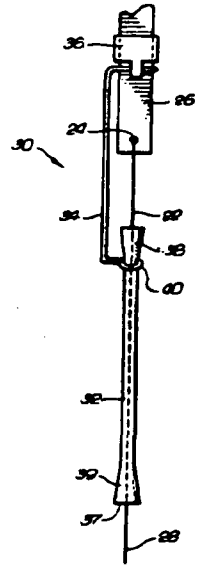

N92-22035* National Aeronautics and Space Administration. Pasadena Office, CA.
GROWTH OF III-V FILMS BY CONTROL OF MBE GROWTH FRONT STOICHIOMETRY Patent
FRANK J. GRUNTHANER, inventor (to NASA), JOHN K. LIU, inventor (to NASA), and BRUCE R. HANCOCK, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 10 Mar. 1992 6 p Filed 28 Feb. 1990 Supersedes N90-27517 (28 - 21, p 3081)
(NASA-CASE-NPO-17724-1-CU; US-PATENT-5,094,974; US-PATENT-APPL-SN-488578; US-PATENT-CLASS-437-85; US-PATENT-CLASS-437-105; US-PATENT-CLASS-437-107; US-PATENT-CLASS-437-133; US-PATENT-CLASS-437-936; US-PATENT-CLASS-437-945; US-PATENT-CLASS-148-DIG.22) Avail: US Patent and Trademark Office CSCL 20L

For the growth of strain-layer materials and high quality single and multiple quantum wells, the instantaneous control of growth front stoichiometry is critical. The process of the invention adjusts the offset or phase of molecular beam epitaxy (MBE) control shutters to program the instantaneous arrival or flux rate of In and As4 reactants to grow InAs. The interrupted growth of first In, then As4, is also a key feature.

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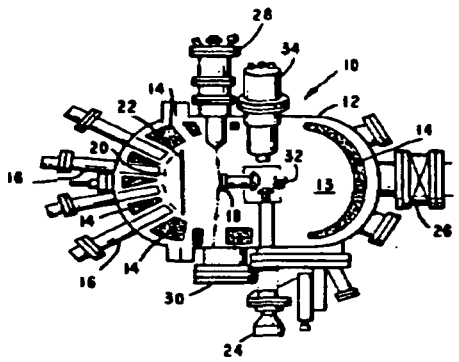

N92-22040* National Aeronautics and Space Administration. Pasadena Office, CA.

METHOD FOR PRODUCING EDGE GEOMETRY SUPERCONDUCTING TUNNEL JUNCTIONS UTILIZING AN NBN/MGO/NBN THIN FILM STRUCTURE Patent

BRIAN D. HUNT, inventor (to NASA) and HENRY G. LEDUC, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 31 Mar. 1992 7 p Filed 18 Jan. 1991 Continuation of abandoned US-Patent-Appl-SN-387928, filed 1 Aug. 1989 (NASA-CASE-NPO-17812-2-CU; US-PATENT-5,100,694; US-PATENT-APPL-SN-642765; US-PATENT-APPL-SN-387928; US-PATENT-CLASS-427-63; US-PATENT-CLASS-427-62; US-PATENT-CLASS-427-419.1; US-PATENT-CLASS-427-419.2; US-PATENT-CLASS-357-5; US-PATENT-CLASS-156-643) Avail: US Patent and Trademark Office CSCL 20L

A method for fabricating an edge geometry superconducting tunnel junction device is discussed. The device is comprised of two niobium nitride superconducting electrodes and a magnesium oxide tunnel barrier sandwiched between the two electrodes. The NbN electrodes are preferably sputter-deposited, with the first NbN electrode deposited on an insulating substrate maintained at about 250 C to 500 C for improved quality of the electrode.

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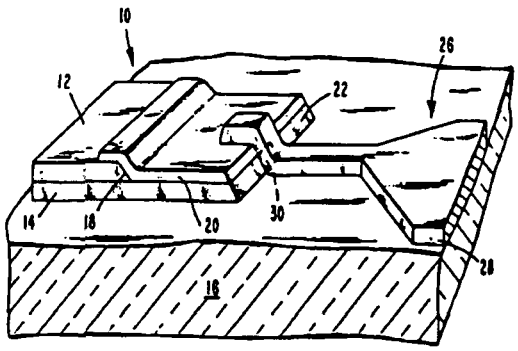

N92-22041* National Aeronautics and Space Administration. Pasadena Office, CA.

EDGE GEOMETRY SUPERCONDUCTING TUNNEL JUNCTIONS UTILIZING AN NBN/MGO/NBN THIN FILM STRUCTURE Patent

BRIAN D. HUNT, inventor (to NASA) and HENRY G. LEDUC, inventor (to NASA) (Jet Propulsion Lab., California Inst. of Tech., Pasadena.) 24 Mar. 1992 7 p Filed 16 Jan. 1991 Continuation of abandoned US-Patent-Appl-SN-387928, filed 1 Aug. 1989 (NASA-CASE-NPO-17812-3-CU; US-PATENT-5,099,294; US-PATENT-APPL-SN-641798; US-PATENT-APPL-SN-387928; US-PATENT-CLASS-357-5; US-PATENT-CLASS-357-4; US-PATENT-CLASS-505-862; US-PATENT-CLASS-505-871; INT-PATENT-CLASS-H01L-39/22; INT-PATENT-CLASS-H01L-27/12) Avail: US Patent and Trademark Office CSCL 20L

An edge defined geometry is used to produce very small area tunnel junctions in a structure with niobium nitride superconducting electrodes and a magnesium oxide tunnel barrier. The incorporation of an MgO tunnel barrier with two NbN electrodes results in improved current-voltage characteristics, and may lead to better junction noise characteristics. The NbN electrodes are preferably sputter-deposited, with the first NbN electrode deposited on an insulating substrate maintained at about 250 C to 500 C for improved quality of the electrode.

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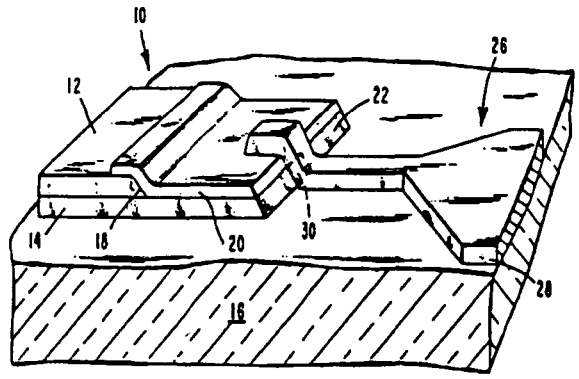

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NASA *patent application specifications* are sold in paper copy and microfiche by the National Technical Information Service. The US-Patent-Appl-SN-number should be used in ordering either paper copy or microfiche from NTIS.

LICENSES FOR COMMERCIAL USE: INQUIRIES AND APPLICATIONS FOR LICENSE

NASA inventions, abstracted in *NASA PAB,* are available for nonexclusive or exclusive licensing in accordance with the NASA Patent Licensing Regulations. It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the NASA Patent Licensing Regulations.

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA-owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in *NASA PAB.*

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

STANDING ORDER SUBSCRIPTIONS

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NASA Case Number Prefix Letters	Address of Cognizant NASA Patent Counsel
ARC-xxxxx XAR-xxxxx	Ames Research Center Mail Code: 200-11A Moffett Field, California 94035 Telephone: (415) 694-5104
ERC-xxxxx XER-xxxxx HQN-xxxxx XHQ-xxxxx	NASA Headquarters Mail Code: GP Washington, D.C. 20546 Telephone: (202) 453-2417
GSC-xxxxx XGS-xxxxx	Goddard Space Flight Center Mail Code: 204 Greenbelt, Maryland 20771 Telephone: (301) 286-7351
KSC-xxxxx XKS-xxxxx	John F. Kennedy Space Center Mail Code: PT-PAT Kennedy Space Center, Florida 32899 Telephone: (305) 867-2544
LAR-xxxxx XLA-xxxxx	Langley Research Center Mail Code: 279 Hampton, Virginia 23365 Telephone: (804) 865-3725
LEW-xxxxx XLE-xxxxx	Lewis Research Center Mail Code: 500-318 21000 Brookpark Road Cleveland, Ohio 44135 Telephone: (216) 433-5753
MSC-xxxxx XMS-xxxxx	Lyndon B. Johnson Space Center Mail Code: AL3 Houston, Texas 77058 Telephone: (713) 483-4871
MFS-xxxxx XMF-xxxxx	George C. Marshall Space Flight Center Mail Code: CC01 Huntsville, Alabama 35812 Telephone: (205) 544-0024
NPO-xxxxx XNP-xxxxx FRC-xxxxx XFR-xxxxx WOO-xxxxx	NASA Resident Legal Office Mail Code: 180-801 4800 Oak Grove Drive Pasadena, California 91103 Telephone: (818) 354-2700

PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

14 CFR Part 1245

Licensing of NASA Inventions

AGENCY: National Aeronautics and Space Administration
ACTION: Interim regulation with comments requested.

SUMMARY: The National Aeronautics and Space Administration (NASA) is revising its patent licensing regulations to conform with Pub. L. 96-517. This interim regulation provides policies and procedures applicable to the licensing of federally owned inventions in the custody of the National Aeronautics and Space Administration, and implements Pub. L. 96-517. The object of this subpart is to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

EFFECTIVE DATE: July 1, 1981. Comments must be received in writing by December 2, 1981. Unless a notice is published in the **Federal Register** after the comment period indicating changes to be made, this interim regulation shall become a final regulation.

ADDRESS: Mr. John G. Mannix, Director of Patent Licensing, GP-4, NASA, Washington, D.C. 20546

FOR FURTHER INFORMATION CONTACT:
Mr. John G. Mannix, (202) 755-3954.

SUPPLEMENTARY INFORMATION:

PART 1245—PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

Subpart 2 of Part 1245 is revised to read as follows:

* * * * *

Subpart 2—Licensing of NASA Inventions

Sec.

Restrictions and Conditions

Types of Licenses

Procedures

Authority: 35 U.S.C. Section 207 and 208.94 Stat 3023 and 3024.

* * * * *

Subpart 2—Licensing of NASA Inventions

§ 1245.200 Scope of subpart.

This subpart prescribes the terms, conditions and procedures upon which a NASA invention may be licensed. It does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government's acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

§ 1245.201 Policy and objective.

It is the policy and objective of this subpart to use the patent system to promote the utilization of inventions arising from NASA supported research and development.

§ 1245.202 Definitions

(a) "Federally owned invention" means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.

(b) "Federal agency" means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a Federally owned invention.

(c) "NASA Invention" means a Federally owned invention with respect to which NASA maintains custody and administration, in whole or in part, of the right, title or interest in such invention on behalf of the United States Government.

(d) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of these regulations, the size standard for small business concerns involved in Government procurement, contained in 13 CFR 121.3-8, and in subcontracting, contained in 13 CFR 121.3-12, will be used.

(e) "Practical application" means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such condition, as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.

(f) "United States" means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

§ 1245.203 Authority to grant licenses.

NASA inventions shall be made available for licensing as deemed appropriate in the public interest. NASA may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this subpart on inventions in its custody.

Restrictions and Conditions

§ 1245.204 All licenses granted under this subpart.

(a) *Restrictions.* (1) A license may be granted only if the applicant has supplied NASA with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant's capability to fulfill the plan.

(2) A license granting rights to use or sell under a NASA invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.

(b) *Conditions.* Licenses shall contain such terms and conditions as NASA determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this subpart. The following terms and conditions apply to any license:

(1) The duration of the license shall be for a period specified in the license agreement, unless sooner terminated in accordance with this subpart.

(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of NASA, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The license may provide the licensee the right to grant sublicenses under the license, subject to the approval of NASA. Each sublicense shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to NASA.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) All licenses shall normally require royalties or other consideration.

(8) Where an agreement is obtained pursuant to § 1245.204(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall recite such agreement.

(9) The license shall provide for the right of NASA to terminate the license, in whole or in part, if:

(i) NASA determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of NASA that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) NASA determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this subpart, upon mutual agreement of NASA and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this subpart shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Types of Licenses

§ 1245.205 Nonexclusive licenses.

(a) *Availability of licenses.* Nonexclusive licenses may be granted under NASA inventions without publication of availability or notice of a prospective license.

(b) *Conditions.* In addition to the provisions of § 1245.204, the nonexclusive license may also provide that, after termination of a period specified in the license agreement, NASA may restrict the license to the fields of use or geographic areas, or both, in which the licensee has brought the invention to practical application and continues to make the benefits of the invention reasonably accessible to the public. However, such restriction shall be made only in order to grant an exclusive or partially exclusive license in accordance with this subpart.

§ 1245.206 Exclusive and partially exclusive licenses.

(a) Domestic licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on NASA inventions: (i) 3 months after notice of the invention's availability has been announced in the **Federal Register;** or (ii) without such notice where NASA determines that expeditious granting of such a license will best serve the interests of the Federal Government and the public; and (iii) in either situation, specified in (a)(1)(i) or (ii) of this section only if:

(A) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period;

(B) After expiration of the period in § 1245.206(a)(1)(iii)(A) and consideration of nay written objections received during the period, NASA has determined that:

(*1*) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilizaiton by the public;

(*2*) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(*3*) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(*4*) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(C) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(D) NASA has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to domestic exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to NASA the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) Foreign licenses.

(1) *Availability of licenses.* Exclusive or partially exclusive licenses may be granted on a NASA invention covered by a foreign patent, patent application, or other form of protection, provided that:

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the **Federal Register,** providing opportunity for filing written objections within a 60-day period and following consideration of such objections;

(ii) NASA has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) NASA has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) *Conditions.* In addition to the provisions of § 1245.204, the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) *Record of determinations.* NASA shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Procedures

§ 1245.207 Application for a license.

An application for a license should be addressed to the Patent Counsel at the NASA installation having responsibility for the invention and shall normally include:

(a) Identification of the invention for which the license is desired, including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(*d*) Name, address, and telephone number of representative of applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether applicant is a small business firm as defined in § 1245.202(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under Federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

§ 1245.208 Processing applications.

(a) Applications for licenses will be initially reviewed by the Patent Counsel of the NASA installation having responsibility for the invention. The Patent Counsel shall make a preliminary recommendation to the Director of Licensing, NASA Headquarters, whether to: (1) grant the license as requested, (2) grant the license with modification after negotiation with the licensee, or (3) deny the license. The Director of Licensing shall review the preliminary recommendation of the Patent Counsel and make a final recommendation to the NASA Assistant General Counsel for Patent Matters. Such review and final recommendation may include, and be based on, any additional information obtained from applicant and other sources that the Patent Counsel and the Director of Licensing deem relevant to the license requested. The determination to grant or deny the license shall be made by the Assistant General Counsel for Patent Matters based on the final recommendation of the Director of Licensing.

(b) When notice of a prospective exclusive or partially exclusive license is published in the **Federal Register** in accordance with § 1245.206(a)(1)(iii)(A) or § 1245.206(b)(1)(i), any written objections received in response thereto will be considered by the Director of Licensing in making the final recommendation to the Assistant General Counsel for Patent Matters.

(c) If the requested license, including any negotiated modifications, is denied by the Assistant General Counsel for Patent Matters, the applicant may request reconsideration by filing a written request for reconsideration within 30 days after receiving notice of denial. This 30-day period may be extended for good cause.

(d) In addition to, or in lieu of requesting reconsideration, the applicant may also appeal the denial of the license in accordance with § 1245.211.

§ 1245.209 Notice to Attorney General.

A copy of the notice provided for in §§ 1245.206(a)(1)(iii)(A), and 1245.206(b)(1)(i) will be sent to the Attorney General.

§ 1245.210 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, NASA shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license should not be modified or terminated.

§ 1245.211 Appeals.

(a) The following parties may appeal to the NASA Administrator or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(1) A person whose application for a license has been denied;

(2) A licensee whose license has been modified or terminated, in whole or in part; or

(3) A person who timely filed a written objection in response to the notice required by §§ 1245.206(a)(1)(iii)(A) or 1245.206(b)(1)(i) and who can demonstrate to the satisfaction of NASA that such person may be damaged by the Agency action.

(b) Written notice of appeal must be filed within 30 days (or such other time as may be authorized for good cause shown) after receiving notice of the adverse decision or determination; including, an adverse decision following the request for reconsideration under § 1245.208(c). The notice of appeal, along with all supporting documentation should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, DC 20546. Should the appeal raise a genuine dispute over material facts, fact-finding will be conducted by the NASA Inventions and Contributions Board. The person filing the appeal shall be afforded an opportunity to be heard and to offer evidence in support of the appeal. The Chairperson of the Inventions and Contributions Board shall prepare written findings of fact and transmit them to the Administrator or designee. The decision on the appeal shall be made by the NASA Administrator or designee. There is no further right of administrative appeal from the decision of the Administrator or designee.

§ 1245.212 Protection and administration of inventions.

NASA may take any suitable and necessary steps to protect and administer rights to NASA inventions, either directly or through contract.

§ 1245.213 Transfer of custody.

NASA having custody of certain Federally owned inventions may transfer custody and administration in whole or in part, to another Federal agency, of the right, title, or interest in any such invention.

§ 1245.214 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to § 1245.207(h) and any report required by § 1245.204(b)(6) may be treated by NASA as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.

James M. Beggs,

Administrator.

October 15, 1981.

[FR Doc. 81-31609 Filed 10-30-81; 8:45 am]

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	10. Work Unit No.
9. Performing Organization Name and Address NASA Scientific and Technical Information Program	11. Contract or Grant No.
	13. Type of Report and Period Covered Special Publication
12. Sponsoring Agency Name and Address National Aeronautics and Space Administration Washington, DC 20546-0001	14. Sponsoring Agency Code

15. Supplementary Notes

Section 1: Abstracts

16. Abstract

Abstracts are provided for 131 patents and patent applications entered into the NASA scientific and technical information system during the period January 1992 through June 1992. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or patent application.

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Bibliography Number	*STAR Accession Numbers*
NASA SP-7039(04) SEC 1	N69-20701 - N73-33931
NASA SP-7039(12) SEC 1	N74-10001 - N77-34042
NASA SP-7039(13) SEC 1	N78-10001 - N78-22018
NASA SP-7039(14) SEC 1	N78-22019 - N78-34034
NASA SP-7039(15) SEC 1	N79-10001 - N79-21993
NASA SP-7039(16) SEC 1	N79-21994 - N79-34158
NASA SP-7039(17) SEC 1	N80-10001 - N80-22254
NASA SP-7039(18) SEC 1	N80-22255 - N80-34339
NASA SP-7039(19) SEC 1	N81-10001 - N81-21997
NASA SP-7039(20) SEC 1	N81-21998 - N81-34139
NASA SP-7039(21) SEC 1	N82-10001 - N82-22140
NASA SP-7039(22) SEC 1	N82-22141 - N82-34341
NASA SP-7039(23) SEC 1	N83-10001 - N83-23266
NASA SP-7039(24) SEC 1	N83-23267 - N83-37053
NASA SP-7039(25) SEC 1	N84-10001 - N84-22526
NASA SP-7039(26) SEC 1	N84-22527 - N84-35284
NASA SP-7039(27) SEC 1	N85-10001 - N85-22341
NASA SP-7039(28) SEC 1	N85-22342 - N85-36162
NASA SP-7039(29) SEC 1	N86-10001 - N86-22536
NASA SP-7039(30) SEC 1	N86-22537 - N86-33262
NASA SP-7039(31) SEC 1	N87-10001 - N87-20170
NASA SP-7039(32) SEC 1	N87-20171 - N87-30248
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